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THE AGRICULTURAL STUDENT



AGRICULTURAL ENGINEERING NUMBER

JANUARY 1914

15 CENTS

\$1⁰⁰ THE YEAR

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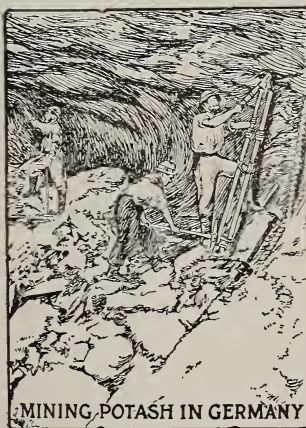
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Dairyman's
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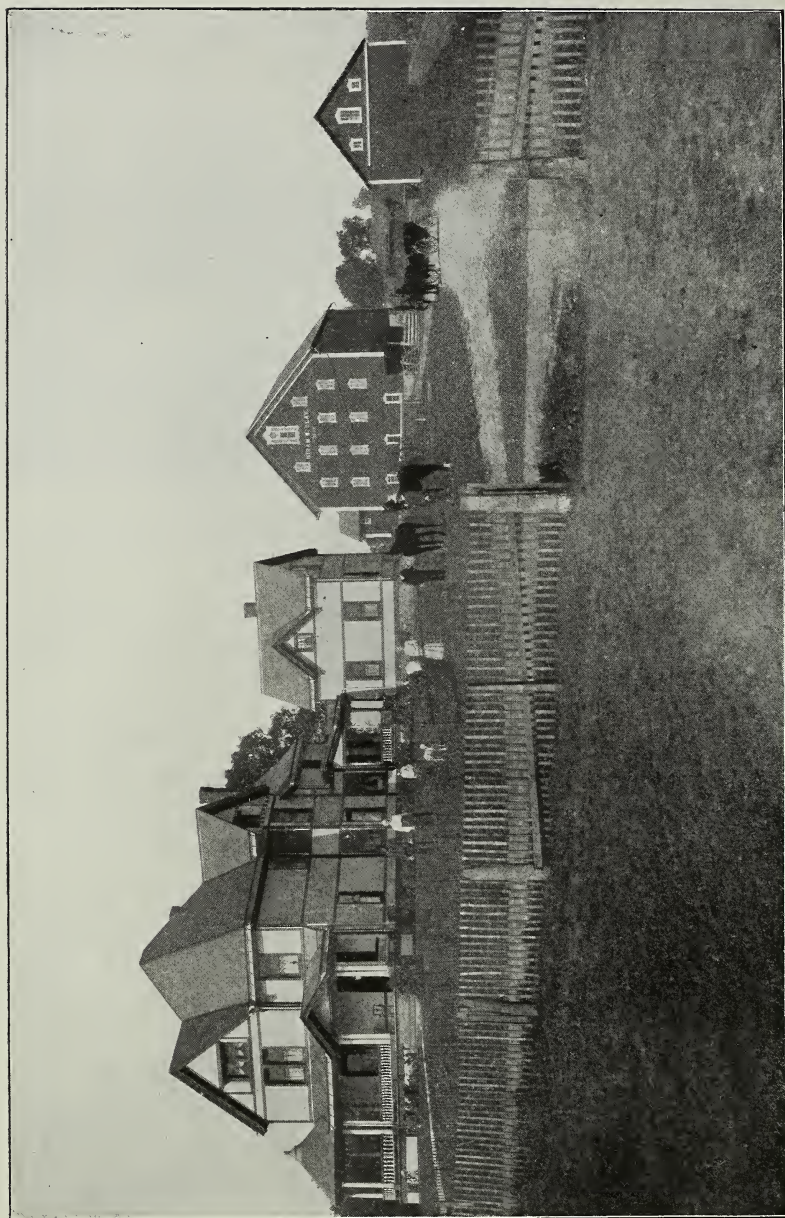
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ONE OF OHIO'S BEAUTIFUL FARMSTEADS.

THE AGRICULTURAL STUDENT

Vol. XX.

OHIO STATE UNIVERSITY, COLUMBUS, JANUARY, 1914

No. 5

Agricultural Engineering as a Profession

J. D. DAVIDSON

Professor Agricultural Engineering, Iowa State College

FOUR years ago last September, four freshmen at Iowa State College classified in the first Agricultural Engineering course leading to a degree ever offered in America. Last June, ten seniors received their bachelor's degree in Agricultural Engineering, the membership of the class having been increased by several who had completed other college courses either in part or in full. In addition to those graduating last spring, seven others had previously graduated from the course, having entered the same with advanced standings. This fall, seventy freshmen are classified in the Agricultural Engineering course. Since the course has been offered at Iowa State College, several other institutions have announced courses in Agricultural Engineering.

Two questions are often asked in connection with this new branch of agricultural education. First, of what does the course in Agricultural Engineering consist; and, second, what is the field open to the graduates of such a course? It is the burden of this paper to answer in a measure these questions.

In brief, the course at Iowa State College is essentially an engineering course. It has the same foundation in the way of mathematics, physics, chemistry, other sciences, general engineering and the so-called cultural subjects like English, literature, history, and economics, as other engineering

courses. To this are added studies in all of the general branches of agriculture, including farm crops, soils, animal husbandry, dairying and horticulture. The course as outlined last year, contained twenty-nine credit hours of such work. The purpose of the strictly agricultural work which is included, is not only to give the student a general knowledge of agriculture, but also to put him in sympathy with, and in touch with agricultural problems. The balance of the time is taken up in emphasizing seven branches of Agricultural Engineering, viz: Farm machinery, farm power, farm structures, rural sanitation including water supply, sewage disposal, heating, lighting and ventilating of buildings, public roads, drainage and irrigation. This is done by making use of engineering studies from other courses and by special studies in Agricultural Engineering. A criticism which has been advanced against the course is that it is not possible to cover thoroughly all these branches and that the graduate would not be strong in any one thing when so trained. The best argument in answer to this is the course itself when compared with other engineering courses. It is believed that it will be conceded that the training furnished by the Agricultural course should fit a graduate to do engineering work along any one of seven branches of Agricultural Engineering previously mentioned with

the possible exception of highway engineering which has become a specialty in itself. The freedom of a limited number of elective studies in the junior and senior year enables the student to emphasize one or more branches to suit his future requirements.

When the Agricultural Engineering course was offered for the first time at Iowa State College, there was a demand for instructors in Agricultural Engineering or farm mechanics from Colleges and secondary schools of agriculture. No institution was making a special effort to train men for this field and it was clearly recognized that none of the existing courses met the exigency of the demand. It was primarily to fill this demand that the course was established. However, when the graduates sought employment, the majority found a more enticing field in commercial fields. In other words, it was discovered that there was a general demand for Agricultural Engineering men. At the present time, some of the graduates are connected with the implement industry, where a knowledge of engineering and agriculture is useful. Several are doing contract work; a few are in business, at least one is running a motor farm and one is a technical newspaper man. The average success of these men during the short time they have been at work has been much above the general average and perhaps better can be expected when the supply is not quite so limited. Two men have undertaken a consulting practice and although their activities have been largely along the line of contracting, they may be said to have been quite successful.

Such has been the history of Agricultural Engineering as a profession as far as one educational institution is concerned. The best evidence that can be submitted in argument is actual results, but for general reasons, why should not the agricultural engineer find a useful field of endeavor? Agriculture is becoming more and more closely related to engineering. The future of Agricultural Engineering as a profession will depend primarily upon whether or not it can be of service to agriculture. Consider the interests represented by Agricultural Engineering. Over eighteen per cent of the farmers' fixed capital is invested in farm buildings and farm implements, according to the last census. Large sums have been spent in reclaiming land by drainage and irrigation, road and bridge construction, water supplies and other branches constituting Agricultural Engineering activities. Not only is the importance of these branches to agriculture defined by the capital invested, but agriculture has well nigh been revolutionized in efficiency through the application of engineering means and methods. No one factor has been so important toward making farm life so attractive as the substitution of machine made methods for hand methods.

There seems to be little doubt but what there is a large field of service open to the Agricultural Engineer, and his future depends only upon whether or not he can render the service demanded. Europe has recognized Agricultural Engineering as a profession for some time, and indications now point toward a more general recognition in America.

The difference between landscape and landscape is small, but there is a great difference in beholders.

Agricultural Engineering—How It Should Be Developed at Ohio State University

PROF. H. C. RAMSOWER

DO you know that the farmers of Ohio have 51 millions of dollars invested in farm machinery? Do you know that 368 millions are tied up in constantly depreciating, non-productive farm buildings? Do you know that these two items combined constitute 22 per cent of the total investment in farm property? If you do, then you recognize at once what an important

ate farm machines, and while he has learned their operation quite well it is a curious fact that few, very few, are familiar with the construction of even the simplest implements. One may follow the plow, vainly endeavoring to keep it level, till one arm becomes paralyzed, when more than likely a slight change in the hitch, altering the bearing at the wing, reducing the suction,



POWER FARMING MEANS ECONOMY OF LABOR.

place any instruction which makes for judicious choice, intelligent care and economic application of these items must have in the development of a state's activities. If you do not, then I will convince you of the merits of the case.

Our field covers a wide range of endeavor and may be divided into more or less distinct divisions, namely: farm machinery, farm power, farm structures and drainage.

It is perhaps true that the average farm boy has an inborn desire to oper-

might have removed the difficulty entirely. If the grain binder misses the bundles badly an endless amount of work may be necessary to bind them by hand, when perhaps a half turn of this nut, loosening of that spring, might remedy the difficulty. A knowledge of construction, of the purpose of this screw or the reason for that spring, is essential. Some of us possess the natural ability to acquire such knowledge readily; more of us get such things from experience, slowly. One cannot know everything about all types of tillage

tools, of seeding machinery or of harvesting machinery, but it is essential in this modern age to know the general principles underlying the construction of the standard types of each.

Who will say that the question of farm power does not deserve the most earnest consideration of every one having farm work to perform? The busy housewife as she wearily plies the dasher of the old fashioned churn is perhaps dreaming of the nicely embroidered pillows which she might have if only somebody or something would work the churn. The mischievous boy would rush eagerly home from school if only the gasoline engine would turn the sheller. Father would come to the house for supper and rest fifteen minutes sooner if the engine or the windmill would pump the water. A question of money to provide such things, you say? Not altogether. Much depends upon knowing what is possible.

How to make the farmstead an enticing place to live; how to best arrange the barns and outbuildings; what kind of timber and paint to use; what kind of fence to build—here are questions begging solution, and it remains for the Agricultural Engineer to attack them, not as the theoretically trained engineer, not as the untrained artisan, but rather as one who, thoroughly saturated with the viewpoint which comes only from practical experience on the farm and aided by a liberal training in engineering fundamentals, views the problem with his eyes steadfastly fixed on efficiency and thoroughness and with his mind no less firmly grasping the farmers financial status.

Hundreds of rods of tile are lying useless today—buried mistakes. 'Twas a task requiring both care in planning and skill in executing, either useless without the other. If our work can

lead one man to drain a swamp, dry up a seepy hillside, or obliterate a basin, the effort will not have been in vain. Any one of the four lines of work mentioned is sufficiently wide in its scope to become the lifework of an instructor. To expect any one man to give efficient instruction covering the whole field of farm engineering is an absurdity; even more—it is an impossibility. What we want, then, is at least four men, with time and opportunity for each to make himself an expert in his line.

The state should provide a man to give his full time and attention to a study of architecture as applied to the farm. Efficient instruction in this line will lead to certain and permanent results. The farmers of the state need expert information on the economy of modern building plans. They should feel free to come to us for assistance in planning their buildings, choosing their fencing materials, laying out their fields, and coming, find some one with time to listen to their demands. Rest assured these requests will come, are coming, and, we are sorry to say, are receiving but scant attention. A recent answer to a query in the Ohio Farmer exploiting a new system of water supply brought within a week many letters from this state and some from other states, asking for information which could not be given in such an article.

Any one who attempts to inform himself on modern farm machinery finds that he is confronted with a stupendous task. We are asked our opinion as to the durability of this manure spreader, of that sulky plow, of the possibilities of a newly patented corn cutter; and with one man making a specialty of farm implements an intelligent answer might be given. Farmers have

a right to come to us for an unbiased opinion and have a right to demand an answer.

Just now there is a remarkable interest being shown in the development of modern conveniences, such as lighting systems for the farm, heating, water supply, sanitation, etc. Many patent appliances worth little more than the room they occupy are being widely advertised and we are asked concerning them. One should be able to know this

to give his work without equipment and lots of it.

Since the Department of Horticulture is now supplied with what it needed years ago, the crying need of our College now is a building for Agricultural Engineering. We cannot teach farm machinery without machines. And we can get these easily—it is possible within three months time to secure fifty thousand dollars worth of farm machinery for instructional purposes, ab-



STRONG HORSES ARE NECESSARY TO OPERATE MODERN MACHINERY.

field of endeavor to a reasonable degree at least, and be in a position to supply dependable information.

Not only do we need an efficient corps of at least four instructors (and in a very few years this would need to be doubled) but we need adequate equipment. For years this work has been the "goat" of our College, and that without a home. As well ask a carpenter to build a house without a saw as to ask an agricultural engineer

solutely without cost, if only the state would provide a place to put it. What we need is less lecture work and more laboratory practice, and this demands increased facilities. There is perhaps no department in the College which requires more space for the satisfactory prosecution of its work than does Agricultural Engineering. Without equipment we are helpless. If the work is worth maintaining, and who can doubt it, we must be given adequate tools with which to work.

Fresh Water Systems

S. E. BROWN

AS signified by the title, a fresh water system is one which there is no water storage, the water being delivered to the faucet direct from the source of supply. It is obvious that, in the case of drinking water, this is especially desirable. The fact that no water is stored does not mean, however, that one can only draw water from the faucet when the engine, or whatever power is used to operate the system, is running. There is a large air storage tank, so that one has available a good supply of water at a moment's notice.

The system involves a motive power for driving an air compressor, air tight steel tank, in which the compressed air is stored, and a Fairbanks-Morse Auto-pneumatic pump for each source of water supply, and the necessary pipes to lead the air from the air storage tank to the Auto-pneumatic pumps in the source of supply; also pipes to lead the water from the source of supply to wherever desired. The power may be either an engine or an electric motor. The plumbing, etc., is identical, of course, with that of any ordinary plumbing system.

The Fairbanks-Morse Auto-pneumatic pump makes use of well known and simple principles in its operation. It consists of two small air tight tanks or cylinders (see illustration Fig PP 1960), submerged in the water and fitted with inlet and outlet valves for compressed air and water. The Fairbanks-Morse Auto-pneumatic pump is fitted with an automatic device which opens and closes the valves when the pump is in operation. The pump works as follows: When the water inlet valve at the bottom of a tank is open the air

exhaust valve at the top is open, and the tank fills with water at the same time it empties of air. Now, being full of water, the water inlet and air outlet closes and the air inlet valve opens admitting compressed air at the top of the tank. This forces the water out through the water outlet valve and through the faucet. As soon as the tank is again empty of water, the air inlet and water outlet close and the air outlet and water inlet open again, allowing water to enter. This process is repeated continually in both the tanks—one being always full of water when the other is full of air, so that there is a constant stream of water at the faucet. Opening the faucet starts the pump automatically, and it operates only when the faucet is open.

The illustration, Fig. PP3091, shows an installation consisting of a Fairbanks-Morse $3\frac{1}{2} \times 4\frac{1}{2}$ " single cylinder air cooled compressor, and a Jack Junior, one horsepower gasoline engine. This power plant delivers 4.3 cubic feet of air per minute, sufficient for operating one No. 6 Auto-pneumatic pump continuously at 25 lbs. working pressure. A second No. 6 pump could be operated at intervals. The air tank is 36" in diameter, 6' high. This makes an excellent system for ordinary household service, where the well is not over 50 feet deep.

The illustration shows how the compressor is connected to the tank, and also the special gate valve for confining the air in the tank. The check valve prevents the compressed air from getting back to the compressor. A safety valve prevents damage to engine, compressor or tank.

Air is always taken from top of tank.

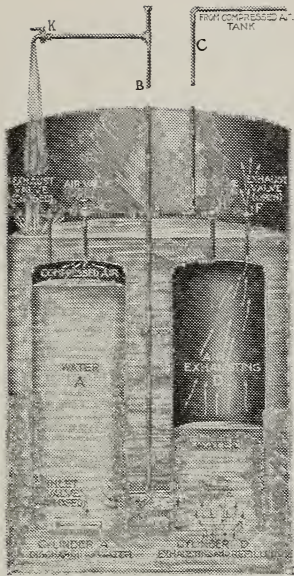
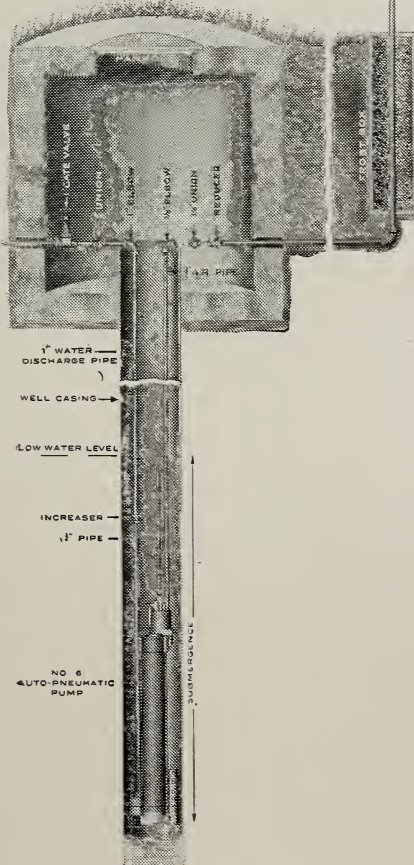


FIG. PP1960—Illustrating Principle of Operation F.M. Auto-Pneumatic Pump.



The pressure of the tank is registered by the gauge on the top.

The pressure reducer is a device which reduces the high pressure in the

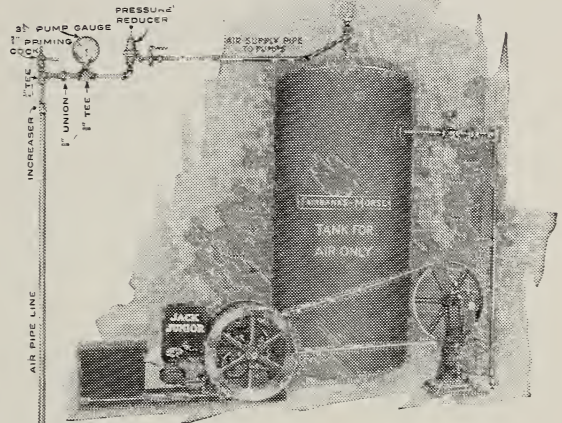


FIG. PP3091—Fairbanks-Morse Fresh Water System Gasoline Engine Drivers.

air tank to the low pressure at which the pump operates. There is a considerable economy in the use of this device, as low air pressure cost much less to use than the higher ones, and for use with the Fairbanks-Morse Auto-pneumatic pump, under ordinary conditions, are quite as good. So the reducer works an appreciable saving for the user as, without it, air at the tank pressure would have to be used for driving the pump.

Suppose the air tank is charged with compressed air at 100 lbs. pressure. If the water should be lifted, say 40 feet, measuring it from the base of the pump to the highest faucet, 25 lbs. would be needed to operate the pump, and the reducer would be set to keep the pressure going into the pump at 25 lbs. Under such condition, over 560 gallons of water could be drawn from the faucet on one charge of air in the 36"x6' air tank, which if filled with water, would hold only 315 gallons.

Several sizes of air tanks can be fur-

nished, to increase or decrease the air storage capacity. They can be placed either vertically or horizontally, without any change in the fittings required.

The Fairbanks-Morse Auto-pneumatic pump can be used in wells, springs or lakes where the water is clear and free from sand and mud, and where the water does not have to be lifted more than 100 feet, measuring from the base of the pump to the highest point of delivery, or where the working pressure does not exceed 65 lbs.

By substituting a 3 $\frac{1}{4}$ x4 $\frac{1}{2}$ Duplex Air Compressor, and using a 2 or 3 H. P. engine, water can be supplied not only for household use, but for stock watering, lawn and garden sprinkling, etc.

In many cases it will be found advantageous to operate the system by an electric motor. Fairbanks, Morse & Co. are prepared to furnish their outfits with motors for either direct or alternating current, operating at 110 or 220 volts. This system is very convenient as, by use of electro-pneumatic controller. The motor can be started and stopped automatically at predetermined minimum and maximum pressures.

The electro-pneumatic outfit requires

very little attention—particularly nothing beyond cleaning the compressor and motor occasionally, and oiling the compressor about once for each six hours continuous running.

The quantity of water discharged depends, of course, upon the working capacity of the pump. A No. 6 Fairbanks-Morse Auto-pneumatic pump throws about 15 gallons a minute, under favorable circumstances. The No. 8 Fairbanks-Morse Auto-pneumatic pump has a capacity of about 30 or 35 gallons per minute.

The great advantage of the fresh water system, over and above that of furnishing a fresh water supply, is that the power plant can be located wherever desired, regardless of the location of the well or cistern; also that one power plant will pump from one or more sources of supply, as desired, depending, of course, upon the size of outfit installed.

Fairbanks, Morse & Co. have just published a very comprehensive catalog covering their water systems, which gives full detailed description of the various types manufactured. Anyone interested in a water system should write them for Catalog No. WT. 1899.

Blow winds and drift the snow,
'Tis winter now.
Because of you, I know
The better how
To prize my glowing hearth;
Beat at my door,
My kettle's song of mirth
I love the more.

What Is Being Done for the Farmer

EDWIN L. BARKER
Of the I. H. C. Service Bureau

IF the good work continues as it has been going, it will be only a short time until the farmer is able not only to do the best for himself, but to begin returning the favor by helping the rest of us. The wide interest in agriculture is the result of a general awakening to the importance of agriculture. At last the nation is awake to the fact that agriculture is the basis of all progress and prosperity.

The policy of the International Harvester Company of America has been always a policy of education. Since our interests lie in better farming, what is more natural than that we should be interested in helping the farmer to better help himself? By this same token, the I H C and the farmers are partners. We are hand-in-hand workers in the production of food stuffs. The development of modern machines, the development of modern methods, the development of big farms, and the development of big farmers have all come about at the same time. They have grown up together, as it were.

Every business institution is, or at least it should be, interested in the farmer, for without farmers there would be no business. The International Company never forgets that whatever is of interest to the farmer is of interest to the Company. His success means our success, just as in days ago our success has meant his success.

We could say that what the International is doing to help the farmer is done out of the fullness of our heart. Or, to put it another way, we could say that all we are doing is done in the spirit of broad philanthropy. But this

would not be honest, for it is not true. All that we are doing for the farmer is done in the spirit of good business. We believe in it—it is a part of our service, our idea of co-operation.

We are all in need of help and education. The more we educate and the more we help each other, the better it will be for ourselves and for the nation. Consequently, all of our work is planned along educational lines. We make it a part of our business to answer the questions of farmers, and in this way we furnish them with the latest and best information. We do more than answer questions about I H C machines; we answer questions about seeds, soils, buildings, and everything that pertains to the farm.

We publish a number of books which are filled with agricultural information. These books treat of a variety of subjects, some pointing directly at the farm and others pointing only indirectly. These books include "The Story of Bread," which traces the world's hunger from almost the beginning of time; "Creeds of Great Business Men," which tells the story of business and shows how that agriculture is the foundation of all business; "The Golden Stream" deals with the subject of dairying; "For Better Crops" is a collection of articles by some of America's foremost crop experts; "For Better Crops in the South" is a similar book, but it covers more directly the problems of agriculture in the southern states; "The Story of Twine" and "The Binder Twine Industry" picture and tell about the processes used in making twine; "The Engine Operator's Guide" is just what

the title implies—a book for those who operate gasoline or kerosene engines; “The Disk Harrow” describes the best methods for the preparation of the seed bed; “Harvest Scenes of the World” pictures harvesting in all countries; and “The Cattle Tick” is a book which describes the ravages of the tick and how to get rid of it.

For all these books we make a small mailing charge. This charge does not in any way represent the worth of the books, but the demand has grown so large that, in order to cut out waste and stimulate appreciation, we have been forced to make the charge.

We have a big illustrated lecture, “The Dawn of Plenty,” which follows the theme of “The Story of Bread.” This lecture is presented to both city and country audiences, and brings vividly before them the development of agriculture.

We send out experts to set up machines and to show the farmers how to operate and how to take care of them. We are maintaining five demonstration farms in various parts of the country. These farms are of great value to the farmers living near by, and from the farms we secure hundreds of bushels of

seed, which is distributed to farmers. Our Agricultural Extension Department is conducting alfalfa campaigns, and in these campaigns the gospel of alfalfa is carried directly to the farmers on the farms.

We are particularly interested in the farmer of tomorrow. Because of this, much of our work is done through schools and colleges. We loan the schools machines for demonstration purposes. We also loan lantern slides, exhibits, and distribute many thousands of our books. To educate the farmer of tomorrow is to educate with a double purpose. He goes home from school and helps to educate the family and the neighbors. In this way he spreads the latest and best ways and means, and in so doing he further educates himself.

Much of our work is carried on through the co-operation of schools, colleges, commercial clubs, banks, railroads, and other institutions which are vitally interested in increasing our crops. We find that nearly all the people, whether they live in the city or the country, are interested in agriculture. Some of our most effective work is being done through big city high schools.



Farm Implements

W. E. TAYLOR
Deere & Company

FARMERS of the present day, or rather those who have had experience in farm operations only during the past twenty or twenty-five years, hardly realize the advancement made in tillage tools and other farm implements during the past sixty years, nor can they appreciate the part improved implements play in soil production.

Sixty years ago farm implements were as crude as the modes of traveling

hours of labor to produce one bushel of wheat, but today because of improved tools, the time has been reduced to ten minutes. The cost of labor then was seventeen cents a bushel, now it is less than four cents. It required four and one-half hours to produce a bushel of corn, today it requires but forty-one minutes. In 1860 it required thirty-five and one-half hours of labor to make a ton of hay, but now eleven and one-



THE UP-TO-DATE MAN EMPLOYS UP-TO-DATE MACHINERY.

and transportation. Then the cast iron walking plow with the heavy wooden beam was the only implement used to turn the soil, and the prevailing motive power was the ox. The cradle harvested the grain and the flail did most of the threshing. Drills, binders, mowers, loaders, threshers, grinders and many other implements that we regard today as indispensable had not been invented sixty years ago.

Modern Implements Save Time and Labor. As an evidence of the economic benefits of modern implements, we note that sixty years ago it required three

half hours. Then the cost of labor was approximately \$3.00 per ton, but now \$1.29. When we consider the great advance in the cost of a day's labor, we will have some idea of the part implements play in assisting the farmer.

Modern Implements Increase the Soil's Producing Ability. Implements not only lessen the time of labor and the cost to produce a crop, but if they are properly used they very materially increase the producing ability of the soil. Thorough and scientific tillage is being recognized as one of our best manuriers. It should be remembered how-

ever, that the proper adaptation of implements to the soil and cultivation is as important as the adaptation of crops to the soils and conditions, for certainly haphazard and unscientific methods in either case will not bring the best results.

The Plow. The plow is intended to perform the first work in making the seed bed. The seed bed is the home of the plant and if the farmer thoroughly understands the requirements of the plant, he will then be able, through the use of tools, to provide that which the plant demands in order to secure the maximum results. No fast rule can be laid down regarding the depth to plow or the kind of plow to use. The farmer should be guided by soil conditions, exercising good judgment. If the soil is a deep loam rich in humus, a deep seed bed is admissible and a deep tilling plow should be used, the benefits being in keeping with the depth it is tilled. If the subsoil is sand or gravel, then a deep going plow should not be used for the reason that to bring sand or gravel to the surface which is not rich in humus would prove disastrous to the crop. Again, the farmer should select a plow adapted to his soil. For instance a sticky gumbo requires a share and moldboard of great hardness and proper curve, while a sandy or gravelly soil requires a chilled steel plow.

As previously stated, the farmer plows for the purpose of making a seed bed. To simply invert the soil, however, would fall far short of fulfilling the requirements. The soil should be thoroughly pulverized and inverted for the purpose of aerating it and promoting chemical action. If soils are so compact that atmospheric oxygen does not have a free circulation, nitrifying bacteria cannot exist, but a micro-organ-

ism known as de-nitrifying or anaerobic bacteria will thrive, thereby depleting the soil of nitrogen. Thorough pulverization is necessary, first to assist in aeration, second to break up lumps or separate the particles of soil. This is necessary for the reason that plant food in a soluble state forms a film around each particle of soil. This plant food is taken up by the minute food gathering roots through a process known as osmosis. If the lumps exist and the soil particles are firmly cemented together, the little tentacles cannot penetrate them, hence the feeding area is greatly restricted. To illustrate; if a cubic foot of lumps one or more inches in diameter have a surface area of approximately thirty square feet, the same lumps if thoroughly pulverized will afford an area of approximately thirty thousand square feet for the reason that the particles of soil are so small that if placed side by side it requires more than a thousand to make an inch. It has been repeatedly demonstrated that the farmer can double his crop on lumpy ground if the lumps are thoroughly pulverized.

The Disc Harrow. The disc harrow is valuable for four purposes.

1. It should be used before the ground is plowed in order that the surface lumps will be pulverized and all surface trash worked into the seed bed. If this is not done, the contact between the bottom of the furrow and the furrow slice will not be compact, thereby materially retarding capillary attraction.

2. The disc harrow is an excellent pulverizer. If the double disc harrow is used and lapped, most of the lumps will be broken up.

3. The disc harrow is probably one of the best packers that has been devised. It acts on the same principle as

the spade does in packing dirt under a railroad tie. It must be remembered that while plant roots do not thrive in a hard seed-bed, they do require, in order to make a rapid growth, a compact seed bed.

4. In the writer's judgment, the disc harrow is the best implement known to mix the soil. Thorough mixing is necessary to bring about chemical action. Elements may exist in abundance, but if they are not brought together, plant food compounds are not formed. The baker may have flour, yeast, milk, lard, salt, etc., in his bread pan but they would be of little use until he has kneaded the mass thoroughly. The disc harrow kneads the soil and makes available elements which exist in most soils in abundance. The disc harrow, next to the plow, is the most important implement used on the farm.

The Sub-soil Plow. The subsoil plow is useful for two purposes.

1. To break up and mellow a hard pan, thereby permitting the penetration of roots to the deeper subsoils.

2. To assist in storing water in the deeper subsoils where it can be utilized in the event of drouth.

The best implement yet devised for this purpose is one constructed not unlike a straight coulter. The point should be very small, not more than an inch in thickness, and the cutting part not more than a half inch thick. Water and air will naturally enter this gash and when it reaches the bottom will spread out and move upwards by capillary attraction, thereby mellowing the hardest hardpan.

Corn Cultivator. The farmer should bear in mind the fact that if the seed bed is properly made it is necessary to cultivate corn for two purposes only, first to remove weeds and second to

form a mulch to prevent the escape of moisture.

After the plant has attained a growth of six or eight inches, deep plowing is not advisable for the reason that the roots, which are apt to be within three or four inches of the surface, especially if the season is wet, are pruned thereby cutting off the arteries which carry plant food and water into the plant.

It is safe to say that deep cultivation will reduce the corn crop from twenty-five to thirty per cent. If, however, the seed bed is deep and the growing season is dry, there is less danger from using deep shovels than when the seed bed is shallow and the season is wet. Probably the best implement to use until the corn is too high to straddle the row is the disc cultivator equipped with smoothing irons or a cultivator with very small shovels. After the corn has attained a growth so that it is impossible to straddle the row, a one-horse cultivator with small shovels or spike teeth will keep down weeds and maintain a mulch.

The Roller. Rolling the ground is very beneficial after grain has been sown or corn planted, for the reason that it packs the soil around the seed thereby hastening germination. Even after corn and grain is up, if the soil is extremely loose around the roots, rolling is always beneficial.

The Corrugated Roller is far preferable to the smooth roller for it not only pulverizes lumps and firms the soil around the roots, but if it is run at right angles to the prevailing wind it materially prevents soil from blowing. The roller should never be used when the surface of the ground is wet.

The Hay Rake. To properly cure hay, the right type of rake should be used. Most of the moisture of newly

cut hay is in the stem and it escapes, if properly cured, through the leaves. If the hay is permitted to lay on the ground in the hot sun, the leaves shrivel, closing the escape pores, thus holding the moisture in the stem. While such hay may appear to be cured, unless it lays until it is sunbaked (a condition that depreciates in a great measure its feeding value) it will mold when placed in the stack or mow because of the excessive moisture in the stem.

If it is raked in a windrow with the ordinary straight delivery rake, it is

left so compact that evaporation is very slow. If, however, the side delivery rake is used, the cylindrical windrow is formed through which air circulates freely, carrying away moisture from both stem and leaf and at the same time the leaves are not sunbaked and shriveled.

Thus it is with most of the modern farm implements. If the farmer understands the phenomena of plant life, if he knows the requirements of his crop, he will then be able to meet them by an intelligent use of the modern implements.

The Place of Agricultural Engineering in the Agricultural College Curriculum

P. S. ROSE

Editor of Gas Review

IF a student takes a general course in agriculture he studies a little botany but when he gets through he is not a botanist. Likewise he studies chemistry but he does not graduate as a chemist. In the same way he may take some courses in agricultural engineering but he will not be an engineer. It is not intended that he should. His aim is to obtain a knowledge of scientific agriculture. Consequently agricultural engineering should occupy a subordinate position in the general curriculum about co-ordinate with botany

And just as in these subjects it probably will be found advisable to establish certain minimum requirements and then offer a number of elective courses. For example, in the dry regions of the West, a course in irrigation might be required while in Ohio or Illinois, drainage might more appropriately be substituted. Local and climatic conditions must not be overlooked.

I am not prepared to say just how

much engineering should be required, but it seems to me there ought to be some. Every farmer has engineering problems to solve and he has generally from a third to a half of his capital invested in buildings or machinery. The proper use, care or replacement of these, together with the health of his family and stock, depend upon some knowledge of engineering. His problems, wherever he may be located or whatever branch of agriculture he follows involve, buildings, sanitation, heating, lighting and a water supply. Besides these he can hardly escape having to use some sort of power machinery. These appear to be fundamental requirements at the present time and when we view the past, and observe how mechanical appliances have been adapted to farm life, we may feel assured that there will be even more necessity in the future than in the present for at least a rudimentary knowledge of the subjects mentioned.

The student who takes a course, say in farm structure, may never care to do any actual construction work, as a matter of fact, he could hardly afford to do so if he were a good farmer, but the knowledge will prove highly valuable when he makes his plans. These courses are not intended, or at least should not be intended, to make engineers or craftsmen but to help a man determine what he needs. The elective courses, which should cover a fairly wide range in our larger college, should have the same end in view. For example, if a man has an extensive drainage system to install, he probably will let the job to a contractor who is equipped to do the work. That would be the proper procedure and yet, he ought to know enough first, to determine if the project is feasible and second, if the work is being done properly.

It is extremely doubtful if agricultural engineering can be truthfully termed a profession. There is almost no demand for agricultural engineers in the commercial world and that is, in my opinion, indisputable evidence that it ought not be termed a profession. There are, it is true, a number of teachers of agricultural engineering and a number of engineers connected with agricultural implement manufacturing concerns that call themselves agricultural engineers, but these men were almost without exception trained as mechanical or civil engineers. If we want a man to do a big job of either irrigation or drainage, a civil engineer is the man we will select. If a manufacturer wants a new machine designed he will select a mechanical engineer who has had some experience with the particular line of machinery to be designed. This is only natural because,

while the adaptation of the machine may be purely agricultural, the designing and building of it is purely mechanical engineering involving the problems of designing and of materials.

It is extremely debatable whether, outside of preparing teachers, it is advisable to offer complete courses leading to a degree in agricultural engineering. All the courses I have ever seen outlined will most surely turn out graduates that are neither farmers nor engineers. If a young man intends to be a farmer his principal study should be agriculture, with a little shop work and general engineering covering the problems he is likely to encounter. If he wishes to be an engineer, then he ought to take a purely engineering course. If in later life it becomes his duty to design a plow he can soon acquire enough knowledge of the mechanical properties of soils, or whatever other agricultural knowledge he needs, to select the proper materials and fashion them to the correct form.

There is even a suspicion in my mind that the term agricultural engineering itself may be a misnomer. It suggests a profession, something distinct from other engineering professions, a thing the facts do not warrant, and yet it may soon become a profession. If the county adviser system of educating farmers proves as successful as its friends prophesy, and if in four or five years it can be shown that our acreage yields are higher where this system prevails, it may be found advisable to provide such men with assistants who possess considerable engineering ability, adapted to the local needs. This appears to me to be about the only means by which we can ever hope to have a large active agricultural engineering profession.

Farm Lighting Plants

JOHN P. STOUT
Extension Dept., Ill.

FARMERS are now turning their attention to the problem of making their homes convenient and lessening the work of the housewife as much as possible. One of these conveniences is some system of lighting aside from the kerosene lamp.

The development in method of lighting has kept pace with the development of other phases of agriculture. We have passed through the torch or burning pine knot stage on to the tallow dip, then the tallow candle which was soon followed by the candle. The next step was a crude oil lamp and these oil or kerosene lamps have been developed until now there are on the market lamps that for softness of light, brilliancy, power of flooding the entire room with light without any shadows and for economy of operation are not exceeded by any form of light. With such light, however, we have the periodic filling and cleaning which is work for the housewife.

Aside from coal oil lamps, which we want to supercede by some more convenient form of light, there are three systems; the gasoline gas, acetylene gas and electric.

The gasoline gas system is one burning a gas made by mixing high grade gasoline and air, the gas being stored outside the house and preferably underground. The whole plant may be installed outside and the gas piped to the house as any illuminating gas. The principle of this system is the passing of air over or through the gasoline in a mixer which is merely a physical action. The pressure on the gas is given in either of two ways. One very small system for only two or three lamps

compressed air is pumped, but for a large system in a house pressure is given by lifting a large weight with a small windlass. When a gas jet is opened the weight descends slowly and forces the gas through the pipes.

This system is excellent for lighting and it may also be used for heating purposes in the summer. Especially is this a boon to the housekeepers. This plant has the advantages of being low in first cost, economical and simple to operate, and efficient for both light and fuel. This system for a five room house will cost from three to four hundred dollars, depending on the kind of fixtures. The gasoline if used for light alone would probably not exceed fifteen to twenty dollars per year. There is no more danger from fire from this plant than there is from using ordinary illuminating gas since the gas is piped into the house in the same manner. The fixtures or burners required for this gas are not as neat in appearance as are the fixtures for electricity or even for acetylene. Moreover, we have the objection of oxygen consumption.

The acetylene gas system gives an excellent light and has been used quite extensively, generally giving satisfaction but sometimes giving much trouble. This gas is generated by mixing calcium carbide and water, a chemical change taking place by the mixture. The mixing is done automatically so that the gas is evolved only when needed. Acetylene gas is very explosive and the objection often raised is the danger from explosion of a plant. If you could remove the human element there would be no danger, for as long as one is careful to

keep all lights away from the plant there can be no danger. But, the fact that we have to charge the plant with carbide and water makes it possible through carelessness to do great damage.

Acetylene gas does not give any better light than the gasoline gas, but the fixtures are neater. It consumes oxygen just as do oil and gas lights, and it cannot be practically used as a fuel for it generates so small an amount of

some small town. This latter is practical only for a farmer living very near a town. The second source of the current is an isolated farm electric plant.

If it is possible to obtain current from a reliable power company having transmission lines over the country, we consider it more convenient, and also more economical. However, we would emphasize the necessity of it being a "reliable power company." A small town electric light plant, either municipi-



"MAY OUR FARM HOMES BE AS LIGHT INSIDE AS OUTSIDE!"

heat. This plant costs a little less to install than a gasoline plant; is not so simple to operate and there is more danger of fire due to carelessness. The cost of operating the two plants is about the same and both equally lighten the housework.

The third and most convenient form of light is the electric light. The electric current for this light may be obtained from either of two sources. We may be able to obtain current from a transmission line running through the country from a centrally located power house, or by a private line from

pally or privately owned, is not always reliable. Of course, there is the chance of a storm impairing or breaking down a transmission line, thus leaving us without light for a day. At the same time it is possible to have some trouble with an isolated plant. The current furnished by a power company is always high voltage 110 or 220, and so can be used for power and also for heating irons, bread toasters, and all the other electrical conveniences now on the market. The amount of current consumed by any device requiring heat is very great.

The other source of current is an isolated or small plant operated on the farm. There are two types of isolated plants, one producing current of low voltage as 30, 45 or 60 volts, and the other producing current of high voltage, as 110 volts. A plant of either type consists of a generator or dynamo for producing the current; a gas engine or equivalent sources of power for running the generator; a storage battery so that we may have light without having to start the generator; and a switch board for controlling the current both when charging the battery and when using the current.

The first type or low voltage plant furnishes just as good a light as does the high voltage, but it cannot be economically used to develop power or heat, as low voltage motors cost more than high voltage and are not so efficient. Furthermore, low voltage currents cannot be economically carried further than three hundred feet, and even at that distance the current consumed by the resistance of the wire is considerable, so that it is really better not to carry it outside the dwelling. This causes one to forego the convenience of lighting barns or other out-buildings.

Such a plant, exclusive of wiring and fixtures, which are about the same for both types, can be installed at from \$325 up to \$500 or more, depending on size of the battery. The very low priced plants have low capacity batteries, which need frequent charging, and small generators requiring considerable time to charge the battery. If one is absolutely sure that he will never call on his plant for more than light and

not expect too much, the low voltage plant would be adequate, but even then we would try to emphasize the advisability of spending a little more money and getting a plant of some capacity.

Have a battery with a capacity large enough so one can have all the lights one needs in the house, and may burn all the lights all the evening if so desired. The high voltage plant costs more, but this is partly due to the fact that when a farmer installs such a plant it is generally one of large capacity. The 110 volt system will furnish current for light, motors or heating devices. When one has electricity on the farm he soon perceives the convenience of it as a source of power and will wish to install motors for many farm operations. If he is handicapped by a low voltage plant, this will be impossible. Much of the benefit of having electricity on the farm is lost if he cannot light the barns and other buildings. This cannot be done with a low voltage current. A high voltage plant, such as will do all work desired, can be installed for \$750 and on up to any sum one might care to spend, depending on the size of the generator and battery.

In conclusion we would say, make the installation of some lighting system one of the first improvements on the farm-home, thereby shifting the labor of caring for the lights to the man's shoulders and adding a convenience to the entire family. Use electricity if possible, as it can be put to such varied uses. It is clean and burns no oxygen from the air. When possible it is advisable to get current from a transmission line, but if this cannot be done, a high voltage plant will undoubtedly give the most satisfaction.

The Harvester Expert: His Training and Work

C. O. REED

Instructor in Field Machinery, University of Ill.

IN this article we refer to the college student who is especially trained to do expert work on harvesting machinery during his summer vacations at a time when the manufacturer welcomes "short time" expert assistance and when the farmer needs it. To prepare himself for this work the prospective

oughly familiar with the construction of machines, how to build them up from the dismantled state in which they are shipped, and how to do it quickly. There are a number of tricks to the trade that constitute the easy quick methods which he is paid for knowing, and in these methods he must



MAKING PRACTICAL USE OF THE FARM POWER.

expert must complete a course in forge work, one in farm machinery, one in field machinery, and a special course in which he does advanced work on harvesting machinery such as haying tools and grain binders.

The expert must be prepared for two duties in the field. He must be able to quickly set up a machine ready for use and must be able to remedy any trouble which a machine may give whether it is old or new. In his preparatory training then, he first becomes thor-

oughly trained. In the laboratory he dismantles and sets up a machine until it is of second nature to him to make every move at just the proper time and in the proper way. Thus he thoroughly familiarizes himself with seven eight-foot binders and their binder-heads, with four mowers, two side-delivery rakes, two loaders, and a stacker or two. If all of these machines were taken down in detail and thrown into one pile, not only must the student expert be able to

pick all the parts for each individual machine from the pile quickly, but with one good helper he must be able to set up two binders, or four mowers, or three rakes, or two loaders per day.

His construction work well in mind, the expert now turns to a study of troubles, particularly to binder-head and mower troubles. He has an extra binder-head for each binder separately located so he can make all possible adjustments. He is trained to recognize knotter-head troubles from a mere glance at failing band. He must have a fair idea of what is wrong with a machine from bare suggestion of how the machine is acting, and he must be able to proceed with remedy without hesitation though he is trained never to make an adjustment without knowing exactly what effect it will have. He must not stumble or guess; he must know.

Needless to say, not all the students taking this work make good. The successful expert is a modest, quiet, well-appearing fellow with an abundance of good sense, mechanical ability, and intuitive tact and diplomacy. He never complains or loses his temper, and he must have keen ability to help himself out of difficulties. He must be strictly honest, industrious and of good morals. He must be a good fellow well met and of such ability and composure as to gain the confidence of both employer and machine operator. Besides these characteristics he must give promise of an understanding of human nature and of ability to deal with its oddities. It is then well for the expert to tuck a keen sense of humor into his character somewhere for the more he has the more enjoyment he will derive from some of the predicaments. In the laboratory the prospect is carefully scrutinized for these qualities. Like a

piece of steel he is heated, drawn, twisted, tried and tempered in a process which emphasizes his good and poor qualities alike. If flaws in his character appear on the surface he is destined to the scrap heap, but if he is found to be suffering from remedial defects only special training is aimed to strengthen these weak points; if he makes good in the test he completes the course by special lectures on road attitude, appearance and systems. He then receives a University recommendation to a manufacture who accepts his services for the rush of the harvest season. About the middle of June he is started in field work in the State of Illinois and Indiana and follows the harvest north across Iowa and Minnesota or the Dakotas. If the season is favorable he may go on into Canada getting into the Northwest by the time college reopens in September.

Early in the season the expert's work is largely construction work. He is sent into a town to set up a certain number of machines and may remain there from one to six days doing nothing but building. He is always given at least one helper but may be responsible for the services of a half dozen. His talent as an organizer and driver is then called into play and he is thankful that he knows his machine well. As the harvest opens his trouble work begins. Gradually he leaves construction work and is rushed from town to town and field to field remedying machine troubles. He travels nights and works days, and it is now that his real worth is tried. He is blamed by the farmer for everything that has gone wrong on the farm during the last week; the implement dealer curses him for his tardy arrival and even the dog snarls at him because he carries a tool kit. But he must not pass

an irritating remark; his first duty is to fix the man by soothing remarks and then adjust the machine. In all of his dealings he must accept the abuse without a flinch and in this way gain favor for his employer rather than to make enemies. At such times the expert's redeeming qualities are his patience, ability and his keen sense of humor which together allow a good laugh when the storm blows over. He must make good, and when he has done so he is the prince of the community and the closest friend of that same accusing farmer, cursing dealer, or snarling dog.

The question is sometimes asked: Should a University foster a course which gains a summer's position for a very few men? In considering that

question we must bear in mind that the position is the ultimate end of the course, not its purpose. To even the unsuccessful student the course affords an excellent training in machine detail and in the use of tools, and it is a means of developing a student's resourcefulness. To the successful experts the course means not only a training, but the resulting position brings travel which affords a broadening; it means healthy occupation to harden a staleness of muscle that a year of college life produces; it carries sufficient salary to allow the needy student to save; and the experience of meeting and dealing with a variety of men and propositions is to the youth a training whose results are invaluable and permanent.



THE MODERN MACHINES ELIMINATE MUCH OF THE DIRTY WORK OF FORMER YEARS.

A Million for a Foot of String

EDWIN L. BARKER

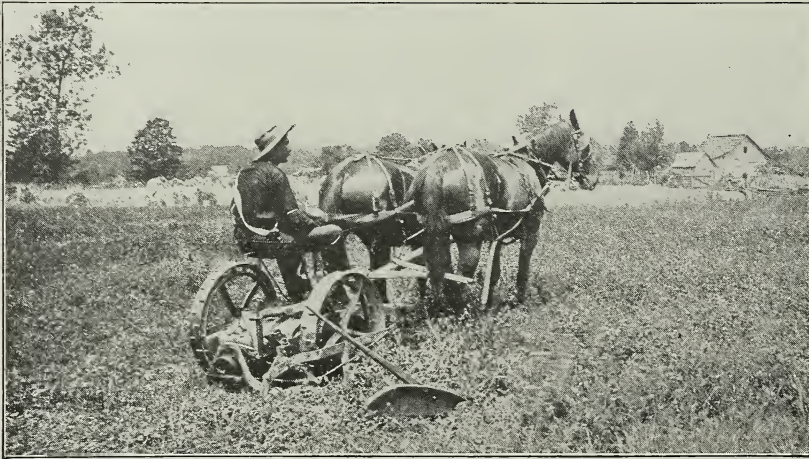
A BIG price, isn't it? That is to say, a million dollars is a big price to pay for a foot of string—for a foot of binder twine. But this is the price paid by the International Harvester Company. This company has spent more than a million in trying to turn out a foot of flax binder twine which will measure up to the required test. And success is still away off there in the future.

Binder twine is a peculiar proposition. And so years of work and a mil-

lions must be planted; but before large crops can be planted, there must be a quick method of harvesting.

When the reaper grew into a binder, wire did the binding. But soon the discovery was made that wire wouldn't do. It clogged the threshing machines, and pieces of wire got into the throats of cattle and killed them.

Then came James Appleby with an attachment which would tie twine. This was in 1878. But to get the right sort of twine—that was the problem.



“THE SONG OF THE MOWER.”

lion of accompanying dollars, much as they may seem, are but incidents in the story of twine.

Few of us—not even farmers as they drive home with loads of twine for the harvest—ever realize the important part twine plays in the production of cheap bread.

The reaper was the forerunner of large farms—the advance agent of modern progress and prosperity. This is true for these reasons: Before people can work well, they must be well fed; before they can be well fed, large

Just here enters an interesting point. William Deering, a New England woolen manufacturer, at the age of forty-two, retired from business. Or, to be exact, he thought he had retired. He took a trip west—to Chicago—to visit a friend. He loaned some money to this friend, then exchanged the loan for stock, and ended by taking the management of the harvesting machine plant. When wire failed and Appleby came along, Mr. Deering remembered his woolen mill experience, and staked his all on twine.

This teaches that men who do things never retire; also, that knowledge never grows useless.

One manufacturer tried out a paper binder twine. But it failed to do the work. Straw failed, and so did grass. A world-wide search was made. At last were found two fibres—manila and sisal. Manila is grown in the Philip-

to twinemaker, and from twinemaker to ropemaker. The "Nothing Doing" sign was out at every place. Rope yarn ran 300 feet to the pound. Mr. Deering's idea for twine was to have it spun as fine as 600 or 700 feet to the pound. At last he found Edwin H. Fittler, a Philadelphia ropemaker. Mr. Fittler didn't think it possible to do such



THE MODERN BINDER USHERED IN THE "DAWN OF PLENTY."

pine, and sisal in Yucatan. But there were no manufacturers who cared to undertake the manufacture of binder twine. Thirty-five years ago manufacturers could not see that a day was approaching when more than 150,000 tons of twine would be used in tying the annual grain crops of the world.

Mr. Deering went from ropemaker

fine spinning and still make the twine strong enough to withstand the strain of the knotter. But after much argument, and the promise of a large order, he agreed to try.

Thus it came about that Mr. Fittler made the first real binder twine. But don't imagine this is the end of the story. It is only the beginning of it.

Mr. Fittler's twine worked all right. It passed through the knotter perfectly, and tied the sheaves of wheat securely. But no sooner were the sheaves tied and placed in shocks than the bugs and insects of the fields held high jinks. They ate the twine as though it had been prepared expressly for their consumption.

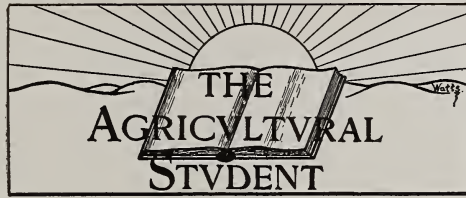
Then expert chemists—the wizards of modern industry—were asked to lend a hand. After many experiments, involving much time and more money, the chemists produced a twine which withstood not only the strain of the knotter, but the weather, and the united attacks of bugs and insects.

The binder twine industry is large and important. America is spending for imported manila and sisal fibers more than \$20,000,000 a year. Yucatan and the Philippines are heavily taxed to produce enough raw fiber for binder twine. These facts, and a desire to give the American farmer a better market for his flax straw induced the International Harvester Company to spend over \$1,000,000 in an effort to produce a satisfactory flax twine. The work was started nearly ten years ago, but has been given up as one of the things impossible.

The company was able to make a good, strong, servicable flax twine; but it could not make the twine bug and insect proof. When the International started its flax twine work, the first problem was the machinery. Flax is coarser and harder to handle than either manila or sisal, and so special, heavy decorticating, breaking and spinning machines had to be constructed. The twine was tried out time and time again, but always with the same result. Several acres of wheat would be cut, and bound, and shocked,, and the next morning not a foot of twine could be found in the field. Oil mixed with sisal or manila, drives the bugs away; but oil mixed with flax seems to whet their appetites. Some of the best chemists in the world worked on this problem—Government chemists were called in—but it still remains a problem without an answer.

If ever a way is found to properly treat flax straw, millions of dollars will pass into the pockets of American farmers. The dollars will come from two directions—from the sale of flax straw, and from being able to buy binder twine at a cheaper price.

To live in the presence of great truths and eternal laws
That is what keeps a man patient when the world ignores him
And calmn and unspoiled when the world praises him.

OF
OHIO STATE UNIVERSITY

A MEDIUM FOR EXCHANGE OF IDEAS BETWEEN COLLEGE AND FARM

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COLUMBUS, OHIO, JANUARY, 1914.

Editorial

This is our first attempt to get out an issue devoted to this important subject. However we feel that Agricultural Engineering in its various phases deserves special consideration. There are many sides to this all important subject and to give each one a fair treatment would fill several volumes. Formerly any kind of a tool was considered satisfactory with which to till the soil; any old house or barn placed anywhere would answer all the needs of man. But now all this is changed. The country people deserve and demand the best information to be had on their subject; they must have the most efficient and up-to-date tools; their homes and barns must be sanitary, comfortable, well located, and withal economical. Experts in farm machinery, motors, drainage, sanitation, rural architecture

are in demand. Big problems are now before the people. Wise heads and clear minds are necessary to their solution. The Agriculture Engineer, even if not known by that name, is filling a long felt want. The farmer is studying his conditions and is asking for help that he may solve his problems correctly. May our students and our authorities on these questions always get at the real facts, be conservative in their advice, lead yet seem to follow, so that our rural problems of all kinds may be solved wisely, correctly and well.

Professor Ramsower sets forth, in his article, very clearly the scope and possibilities of Agricultural Engineering. Professor Ramsower has been placed at the head of this all important department within the last year. Anyone who reads his

NECESSARY
EQUIPMENT.

article carefully will certainly be impressed with the importance and possibilities of this work. It deals with the vital essentials of the farm. How could the farmer get along without machinery, well built barns, good water systems, or well drained land? That is, how could the farmer make a success of his business in this day of strong competition without these things? The farm is more than a work shop. It is a home. The dwelling must be convenient, well planned, well located and well lighted. It must be sanitary and withal suited to the farm and the pocket book of the owner. If our farms were planned more wisely, better drained, equipped with suitable machinery, stocked with live stock that would make money for the farmer and above all have a farm home such as the farmers, their wives and their children deserve, we would hear little about hard times, boys leaving the farm and then the farmers might be investigating the city man.

Now if the Agricultural Engineering department is at the base of all this and teaches and advises on all these subjects don't you think they should have a reasonable amount of equipment and suitable quarters? The main part of such courses ought to be the laboratory work. Yet the laboratory work here is almost nil. If we had suitable rooms or accommodations the manufactures would gladly furnish all the equipment needed in the laboratory. May this department make their needs and possibilities known in no uncertain terms. Let our students express themselves. Is it right to ask and to compel men to take these courses and then omit the real essentials? Let us quit hiding our lights under a bushel but rather set them before the people and in every farm house in the great state

of Ohio. That's what this department is for anyway. It drains the fields, grows better crops more economically, builds barns and houses and installs water works and lighting plants. It can solve the rural problems quicker than all the rural investigations that are instigated by city men can do in kingdom come.

Again—as in years past—we bid you welcome Mr. Short Course Man.

Glad indeed to see you **WELCOME.** and your brothers among us for a time. We are delighted to share our university—and yours, with you. Make yourself at home and mix some recreation and pleasure with your work. While you are enriching your mind with new facts about agriculture; while you are learning how to raise more grain per acre; how to produce more beef and pork per pound of feed—don't forget the other good things to be acquired while here. Make yourself one of us. Visit the Y. M. C. A. and The Student offices. You will always be welcome. Let us send The Student to your home so you may keep in touch with college affairs and activities after you leave us. Remember once a State man always a State man and a Booster. Get into the game, imbibe the Ohio State spirit and for ever be a true son of Ohio State and a loyal Buckeye.

To our Short Course Men we drop a few suggestions along with a challenge.

You are here, primarily, for what? To learn how **SOME** to grow more corn per **POINTERS.** acre, how to raise better beef cattle, how to save your fruit trees by spraying at the proper time? Only incidentally. The basic reason is that you might become a better citizen in

all that citizenship implies in its modern meaning. You do want to learn the facts about agriculture that you imbibe in the class room and from the instructors, but they are only a small part of the great store of ideas, ideals and inspiration that you will receive. Get your classmate's point of view on various questions, visit the places of interest about Columbus and get a broader view of the future of agriculture. Find out what is being done for the country people, learn of some of their problems and get a vision of the future of the farmer and the farm. Become enthused and go home to be a real dynamo, a guide, a counselor and a leader in your community. And now we issue the challenge to you that there is no larger problem fraught with harder work or greater possibilities of success than building up the farm and the rural community, in making the country a place where peace, culture, contentment and prosperity are supreme.

Isn't it time you are subscribing for The Student? There are a few men here who have never given us their subscription. Don't you really think that The Student is worthy of your support? Just look it through carefully, study the composition and the style of articles in it. Look at the contributors. You see many of them are the most sought after in the country. Then just think—the staff can't get out a paper **worthy of the merits of Ohio State** if every one were like you. Your **moral support** will not pay printer's and engraver's bills. There are men here who read The Student and enjoy it and yet do not subscribe to its support. Now be honest with yourself and The Stu-

dent, loosen up. No matter what **your position** you do not wish to be a grafter; send in your subscription at once, get into the game. The average time that the men on The Student staff put in would bring them several dollars each week if turned to work such as other men in school are doing—and it is all given freely for **The Student** and for **Ohio State**. Do you know that a large number of the magazines and farm papers in the reading room that you enjoy are kept there by The Student? Well they are. It takes hundreds of dollars to publish The Student and it is the duty and it should be a pleasure for every man in the college to support it to the extent of one subscription at least.

This is an age of shows, fairs, meetings, conventions and organizations of all kinds. Men are talking efficiency, conservation, demonstration, et cetera. Why not put some of this into practice and have a Winter Fair during Farmers' Week at the Agricultural College? Hundreds, and we soon hope thousands, of farmers will be coming to Columbus for Farmers' Week. The buildings at the fair grounds are well suited and are adequate for such a fair and exhibition. The state corn show, the apple show, the poultry show, the dairyman's meeting and the various live stock organizations could meet and put on their exhibits at that time. Let all the organizations that are connected with the agriculture of the state in any way have their meeting at that time and put on an exhibit. Then there would be something here that was well worth the time of any farmer coming to Columbus. Now that the Governor is endeavoring to secure a Coliseum, winter

SEND IN YOUR SUBSCRIPTION.

shows of all kinds could be easily arranged. A Winter Live Stock Show and an Ohio Dairy Show would be some of the features possible. As Columbus is the most central point in Ohio and easy of access from all parts of the state, and, being the capital and having the State University here it is the logical place for all meetings that are in any way connected with agriculture. The majority of the organizations meet some where in the state each year, the shows are held anywhere—why not bring them together in one central place and make it a fair worth while? Thus would the College, the farmers, and each organization profit by the work and presence of the other.

Every organization that is making a success of its business now has a well organized Publicity Department. Would it not **STATE** be a good thing to **PUBLICITY.** organize the various departments of the state into one department and put a good man in charge of

it. A little of the western spirit, boasting and advertising for Ohio would be the thing. We have the goods, why not have the praise? Instead of so many departments working along in a mediocre and inconspicuous way, unite all the efforts, stop duplication and make every dollar produce 100 cents. (This would be a good question for the Agricultural Commission to take up and solve.) Get a man that knows his business, work where work counts, advertise and help the people at the same time and let our own people and the people of other states know that **the rainbow really comes down in Ohio.**

We wish to thank all who so ably contributed to the success of this issue.

Especial credit is due **ACKNOWLEDG-** Farm Engineering **MENTS.** for the cut on page 363, to the I. H. C. people for cuts on pages 343, 347, 355, 363, 366 and 367; to the Extension Department for the cuts on pages 361, 385 and 389.

We shall reap such joys in the by and by,
 But what have we sown today?
 We shall build us mansions in the sky,
 But what have we built today?
 'Tis sweet in idle dreams to bask,
 But here and now do we do our task?
 "What have we done today?"

—Nixon Waterman.



SPECIALS



THE THREE-YEAR COURSE IN AGRICULTURE.

The faculty of the College of Agriculture has taken an important step in advance in establishing the new three-year course in Agriculture. The two-year course which has existed since the College was established will be abolished and the three-year course will take its place next year. However, those already enrolled in the two-year course will be permitted to complete their work. The important feature of the change, however, is the change in the length of the school year. The two-year course has run parallel with the four-year courses and has had the same length of school year beginning in September and closing in June. The three-year course will have a school year of twenty weeks beginning in October and closing in March.

This change will allow farm boys to spend the growing season on their home farms and it will only be necessary for them to be in the college during the slack months on the farm and it will allow them three years in which to do the work they are now required to do in two years. The subject matter in the three-year course has not been materially changed from what was given in the two-year course. But it is the hope of the faculty that a plan may be worked out by which students may carry on practical or demonstration work on their home farms during the summer months under the direction of their instructors and that students shall make written reports of the same upon their return to the college.

The two-year course has served a splendid purpose in the past and hundreds of Ohio farm boys have been

trained in it and are now making useful rural citizens of the State. The new three-year course should prove far more useful than the two-year course. Arranged as it is to allow the boy to remain on the farm from March to October, hundreds of Ohio farm lads should come to the College to take this course where ten came before.

* * * *

The above article by Dean Homer C. Price sets forth very clearly the essential points of the new three-year course in Agriculture. The proposed course has been advocated for a number of years by some of our leading men in Agricultural lines. Joe Wing has long been an ardent champion of a three-year course. This course certainly has the ear marks of an excellent system of education for our young men who are so situated that they are unable to take the regular four-year course. There are many of these in the great state of Ohio. Now they may come here at little loss of time or money and really get a better agricultural education than was possible under the old system.

If the University is going to give a course in the essentials of Agriculture, that course should be so arranged as to meet the largest number possible. The great trend of education is to help the masses. The Agricultural College at Ohio State has been trying to get close to its constituency—the farmers. This is another gigantic stride in that direction. But to succeed the farmers must co-operate. The young men must be willing to make some sacrifices. Send for the available information on this course and plan to attend next October. You will be benefitted. But to be helped you must attend.—Editor.

WITH THE BREEDER

NOTES OF INTEREST AMONG THE FLOCKS AND HERDS

Fanchion, the beautiful, black Percheron filly, belonging to Mr. E. B. White, which carried away the blue ribbon in the International yearling and futurity events contracted pneumonia and died before reaching Virginia. Thus was cut short the future prospects of a noble mare which might have done a great service to the Percheron breed, and her owner, had she lived to perform the task.

The rugged, much criticized Brown Swiss has recently changed the belief of those who have scored her as an animal departing from the true dairy type. College Bravura 2d at the Michigan Agricultural College has completed a year's test, producing 19,304.6 lbs of milk testing 4.1% of butter fat. She produced in that time 791.85 lbs. of butter fat equivalent to 1000.5 lbs. of butter.

American breeders have caused an evolution in the rough, heavy boned animal coming from the small, mountainous republic of Europe. This change of type as well as the breeding of a thousand and pound cow has been one of their most important aims.

Some important changes in the constitution have been requested to be made at the annual meeting of the Ayrshire Breeders' Association to be held at New York, January 8th. Requests have been made to the Executive Committee that Article VII be changed so

the fee will be two dollars for all bulls over two years of age if their sire and dam, or the dam and paternal grand dam have qualified for the Advanced Registry. Another change is to allow the same privilege to imported bulls when they come under the minimum fee.

The New England club requests that all calves imported in dam be recorded at the same fee that is charged for native bulls. At present the importation fee for a bull is \$10 if the dam and paternal grand dam have records equivalent to Advanced Registry requirements. The fee was placed at this figure to insure the importation of the dairy type of Ayrshire since the buyer would look well to the ancestry of the bull before he purchased. If he is buying a heifer in calf to a bull whose dam has an official record, the recording fee if a bull calf is born, is \$20.

It is proposed to add to the constitution a clause to relieve the Association from any legal responsibility for damage from fraudulent entries in the Herd book.

The Animal Husbandry Department at Washington has again stopped all importations of cattle from the British Isles, due to a fresh outbreak of foot and mouth disease in the district of Sussex. All permits have been discontinued and present ones cancelled. The prohibition upon importation was removed only three months ago after the

veterinarian authorities considered it safe to export cattle from these islands.

“Beginners” in pure bred Jerseys near Oxford, Ohio, were given an excellent opportunity to secure a good foundation for a future herd when the entire herd of H. J. Craig was dispersed at his farm late in November. This herd showed the results of careful selection and a personal interest on the part of the breeder. It was a high producing herd of 32 head with Eminent blood predominating. None of the cattle left the state. C. C. Folck paid the highest price for any individual when he bought Eminent 8th for \$480.

R. and W. Postle, of Camp Chase, Ohio, have the distinction of having bred the Cheviot champions at the 1913 International. They took first honors on their yearling ewe and bred the champion aged ram.

The Department of Agriculture has issued a quarantine order upon all imported cattle. All these whether they are to be used for grazing, breeding, feeding or milk production, must have a certificate of inspection or they will be detained for a length of time as may be necessary at the discretion of the government inspector. A rigid inspection will be made for tuberculosis and other diseases. All expense must be met by the breeder.

Of the sixteen yearlings Percheron stallions that received the highest honors at the International, thirteen were American-bred. This fact shows that America is producing high class horses that are close competitors of those from across the Atlantic.

To Carpenter and Ross, of Mansfield, Ohio, belongs the honor of exhibiting the largest herd of cattle at the International. They showed the 1st prize senior yearling bull, Maxwalton Renown, and were keen competitors in many of the breeding Shorthorn classes.

A request from Ohio has been made to the Federal government for \$500,000 to fight hog cholera in this state. Senator Pomerene is assisting in the fight for the appropriations, some of which, it is hoped, will be used to supplement that now used for this purpose.

The first prize load of Hereford calves at the International, owned by Mrs. J. S. Casement of Painsville, Ohio, will be fed by the owner for the 1914 show. J. W. Keller of Tiffin, Ohio, bought a load of Texas Angus calves at \$49 each. The average price of 11 loads of yearlings at the International sale was \$8.79 per cwt. The champion carlot were Shorthorns and sold for \$9.10.

To one who has been long in city pent,
 'Tis very sweet to look into the fair
 And open face of heaven,—
 to breathe a prayer
 Full in the smile of the blue firmament.

—Keats.

CURRENT AGRICULTURAL LITERATURE

COMMENTS AND CRITICISMS ON CONTEMPORARY CONTRIBUTIONS

Farm and Ranch for Dec. 13, published an article by **J. O. Morgan**, of the University of Texas on "**Growing Crops for the Silos.**" This article gives, in brief, cultural directions for ensilage growing, also, it considers some other crops with which we in Ohio are not familiar.

"**The Udder of the Cow,**" by Prof. **Verne E. LeRoy**, of the Michigan Agricultural College, is the title of an article which appeared in the "**Breeder's Gazette**" for Oct 11. Prof. Leroy has discussed to some length the desirable type of udder, and also, those common forms which are not desirable. Some of the indications of a good cow, as shown by the udder, are given. The article is illustrated by several drawings.

The new and revised edition of "**Veterinary Studies,**" by **M. H. Reynolds**, B. S. A., D. V. M., M. D., University of Minnesota, has recently been received. Here is a book for Agricultural students in Veterinary Medicine or for stockmen. It treats briefly of anatomy, pathology, cause and prevention, infectious diseases, dietetic diseases, miscellaneous diseases, obstetrics and medicines. 290 pages, illustrated. Cloth, net, \$1.60. The Macmillan Co.

An interesting article on "**Milking Shorthorns in England**" by Prof. Geo. L. McKay, appeared in the "**Breeder's**

Gazette" for Nov. 13. It gives some information on the performance of this breed in its native country. In this country they are usually considered a beef breed only, but it is the opinion of the writer that the average cow in England is a little ahead of our average American cow.

"**Power Machinery for Business Orchards**" is the title of a discussion that may be found in the "**American Agriculturist**" for Dec. 6. This discussion considers several of the outfits now on the market, pointing out their strong and weak points. The kind of sprays best adapted for different kinds of work are given. Some points of cultivation are reviewed, and finally, the type of tractor that might be used in orchards is described.

Mr. S. W. Allerton, a large farmer and packer, wrote an article for the "**Breeder's Gazette**" for Nov. 27, in which he advocated some of the principles, which he practices. He has endeavored to point out wherein the common farm practices can be improved. It is his desire to see beef production encouraged rather than dropped.

Prof. C. S. Plumb has given the readers of the "**Ohio Farmer,**" for Dec. 6, a good idea of the Swiss live stock in his article on "**Live Stock Observations in Switzerland.**" He mentions the general farm operations, the breeds of cat-

tle found, and the goats. Our type of Swiss cattle seems to be drifting away from that found in Switzerland, due largely to the different ideals and standards by which the cattle are judged and selected.

Horticultural students will find an interesting article in the "**American Agriculturist**" for Nov. 22, on "**Pushing the Commercial Orchard in Ohio**." Some discussion is given on new packages which have such a marked influence over readiness for sale. The movement seems to be toward the smaller package. Some yields of peach orchards are also given.

Read how the farmers of Kentucky got together in "**The Farmers' Chautauqua**," by **James Speed**. It may be found in "**The Breeder's Gazette**" for Dec. 4. This is something any rural community can do. It is a good plan to get acquainted with farmers and also with representatives of the various government departments. Farm problems of every kind were discussed—even education and the Country Church.

Many articles have appeared during the last few months regarding farm credit. One of the latest, entitled "**Ohio Credit Plan**," appeared in the "**Farm and Fireside**" for Nov. 22. It was written by **B. F. W. Thorpe**, and gives some conditions found in Ohio. It will probably be surprising to many to learn that a few of our Building and Loan Associations have already been extending to the farmer, loans on farm prop-

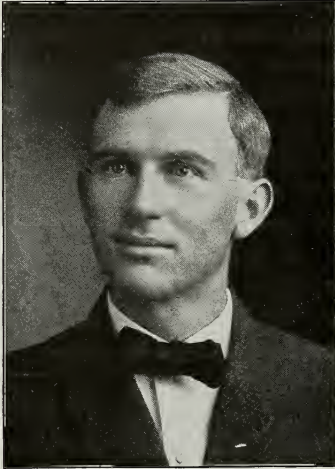
erty for times varying in length, to be decided by the borrower, and at the rate of six per cent. Their methods also have some features of their own which may be more desirable to the American farmer than European methods.

C. S. Wheeler, of the Extension Department, has given us a rather detailed account of the new Government classification of corn in "**The New Grades for Corn**," "**Ohio Farmer**," Dec. 13. This classification is based on moisture content as well as presence of foreign matter and mixed color of grain. A table is given showing the comparative values of the different grades. It is very desirable that such a sound basis should be widely adopted and retained.

"**Wallace's Farmer**" for Nov. 28, gives an instructive account of "**Sweet Clover**" by **J. G. Mosier**, of the University of Ill. This article gives some of the merits of the plant that must be acknowledged in spite of the general disfavor with which it is generally regarded. Two important points to be remembered in growing it are given.

"**Hoards Dairyman**" for Dec. 12, printed an article by **Frank A. Hayes**, on "**Improving the Dairy Herd**." Mr. Hayes has set forth several things that the dairy breeder should keep in mind in the selection of breeding animals. He wants uniform excellence to prevail rather than a few exceptional individuals. He also suggested that the government recognize and reward meritorious work.

ALUMNI WHAT THE BUSY GRADS ARE DOING



Leland E. Call was born on a farm near Hudson, Ohio, in 1881. He attended country school until 1895 when he started to high school at Hudson, where he graduated in 1899. He spent the next two years in California working on fruit farms in the Santa Clara valley and attending Washburn School, a preparatory school for Leland Stanford University. He returned to Ohio in 1901 and graduated from the Western Reserve Academy in 1902 and entered the Ohio State University the same year, graduating in 1906. For two years he was Associate Editor of *The Agricultural Student*. After graduating he had a fellowship in agricultural chemistry, but resigned June 1, 1907, to accept a position as Assistant in Agronomy at the Kansas State Agricultural College, where he has been since that time. In 1908 he was promoted to Assistant Professor of Soils, to Associate Professor in 1911, and to

Professor of Agronomy in 1913. In the winter of 1911 and 1912 Professor Call completed his work for a Master's degree at Ohio State.

Arthur G. McCall was born in McGaw, Scioto County, Ohio, in 1874. He graduated from Ohio State in 1900. From 1901-04, Prof. McCall was Scientific Assistant, Bureau of Soils, U. S. Department of Agriculture. He resigned in 1905 to become professor of Agronomy, Ohio State University. Professor McCall is the author of "The Physical Properties of Soils," "Corn," "Tillage and Cultivation," "Land Drainage," etc.

Joseph F. Baker is now in charge of Soil Investigations at New York State Agricultural Experiment Station. He graduated from Ohio State in '08, but received the degree of Master of Science in Agriculture from Iowa State Agricultural College in 1910.

Chalmers W. DePue, '09, is agronomist for Olmsted Brothers, Landscape Architects, Brookline, Massachusetts. He was formerly manager of a large estate and truck farm in Southwest Texas.

Frederick W. Taylor, '00, is professor of Agronomy at New Hampshire College and Experiment Station. He has written numerous bulletins, circulars and other publications for the New Hampshire Station.

Loring H. Goddard, '92, formerly connected with the Ohio Agricultural Experiment Station at Wooster, is now connected with the national department

of agriculture in the capacity of director in charge of the co-operation of that department with the rural organization service.

M. O. Bugby, '05, formerly acting head of the co-operative department of the Ohio Agricultural Experiment Station is now county agent for Trumbull county. His headquarters are at Warren, Ohio.

John C. McNutt, '07, head of the Animal Husbandry Department, North Carolina Agricultural College, on returning from the International with a party of student stopped at Ohio State for a short visit during which time the party were shown through the various departments of the college.

Altie Darfus, '13, was a recent visitor on the campus. Since graduation he has been in the creamery work at Vassar, Mich., but recently has identified himself with The Detroit Milk Co., having charge of the producing end of the company. The company expects to obtain milk from Canada.

Joseph Cox, '13, resigned his position as instructor in Soils at Penn. State during the Thanksgiving recess and accepted a position as instructor in Cereal Crops in the Michigan Agricultural College.

G. A. Dix, '10, lives on a fine farm near Delaware, Ohio. He is interested in the breeding of Percheron horses, a number of which he exhibited at the North Randal and State Fairs. George A. Dix, Jr., recently appeared at the Dix home.

H. C. George is managing the "home farm" at Okeana, Ohio. Homer announces the arrival of a new member of the family, Vivian Lucile George.

G. R. Hyslop, '07, is at the head of the Department of Agronomy, Oregon

Agricultural College, Corvallis, Oregon.

E. D. Waid, '06, is engaged in Agronomy Extension Work in the Massachusetts Agricultural College at Amherst, Mass.

C. M. Richardson, '10, was recently married and has taken up market gardening and dairy farming near Wickliffe, Ohio.

W. R. Clum, '10, is located at Thornville, Ohio. His wife, Florence Houston, '11, died in September.

D. R. Vannatta, '10, living at Cincinnati, is the father of a baby boy. His wife was Celia Campbell, '11.

M. J. Doherty, '13, is teaching agriculture in the high school at Groveport, Ohio.

A. C. Brookly, '12, has charge of agricultural work in the Adrian State High School at Adrian, Minn.

C. L. Clayton, Hort. '13, who was at the head of city garden work in Louisville, Kentucky, last summer, is now teaching Horticulture at the State Secondary Agr. School, Jonesboro, Arkansas.

John M. Rogers, Hort. '13, is working at the "Brooknook Farms," Edenton, Ohio. During the fall he set out several thousand trees for this concern.

Mrs. Mark Simonton, who last year finished the two year course in Horticulture, has bought a ten acre tract near the storage dam. The ground has been prepared for dynamiting, and apple trees will be planted this spring. Mrs. Simonton expects to erect a summer home upon the tract.

Richard Faxon, Agr. '10, who has been working throughout the west for three years, along horticultural lines, has returned to the east and expects to engage in orcharding in this state.

"THE MAN FROM THE CROWD."

Men seem as like as the leaves on the trees
As alike as the bees in a swarming of bees;
And we look at the millions that make up the State
All equally little and equally great,
And the pride of our courage is cowed.
Then fate calls for a man who is larger than men
And the man comes up from the crowd.

The chasers of trifles run hither and yon
And the small days of small things still go on
And the world seems no better at sunset than dawn
And the race still increases its plentiful spawn
And the voice of its wailing is loud.
Then the Great Deed calls out for the Great Man to come
And the crowd unbelieving sits sullen and dumb;
But the Great Deed is done for the Great Man is come,
Aye the man comes up from the crowd.

There's a dead hum of voices, all say the same thing
And our forefathers' songs are the songs that we sing.
And the deeds by our fathers and grandfathers done
Are done by the son of the son of the son,
And our heads in contrition are bowed.
Lo, a call for a man who shall make all things new
Goes down through the throng—See! he rises in view,
Make room for the man who shall make all things new,
For the man who comes up from the crowd.

And where is the man who comes up from the throng,
Who does the new deed and who sings the new song;
And who makes the old world as a world that is new.
And who is the man? Is it you? Is it you?
And our praise is exultant and proud.
We are waiting for you there, for you are the man,
Come up from the jostle as soon as you can,
Come up from the crowd there as soon as you can,
The man who comes up from the crowd. —Anon.

Secondary Agriculture

Devoted to the Interests of Agricultural Education in High and Common Schools

FRED E. PERRY

The biggest educational problem of our country is the problem of the rural school. There are in round numbers 12,000,000 country boys and girls attending the one room district school. According to the United States Bureau of Education only 25 per cent of these children ever finish the eighth grade and not over 5 per cent have a chance at a high school.

During the high school age life's ideals and plans are formed. It is very important in this day of scientific agriculture that the country boys and girls be given an opportunity for secondary agricultural education in a country high school. In the city high school the course of study is planned to meet the conditions of the city, where the highest good of mankind is to have employment in the city. When country boys and girls attend city high schools, associate with city young people and are educated away from the country life, is it a wonder that the most ambitious leave the country for the city?

Gallons of ink have been used in writing of the shortcomings of the country school. A rural school survey has been completed and a big educational congress held in Columbus. The legislature backed by the governor will take up rural school legislation. But all this will be without avail unless the country people take more in-

terest and pride in their own educational institutions and are willing to support them financially. Good government legislation cannot go ahead of public sentiment. More money must be paid to trained teachers; better buildings and equipment must be provided; and more attractive playgrounds must be made. The agricultural high school—the greatest need of our country life—must be established. It's up to the country folks themselves to demand and secure country schools suited to a rural environment.

In the shadow of the Washington Monument Secretary David F. Houston recently presented diplomas to 75 boy and girl state champions in the corn, potato, cotton, canning, gardening and poultry clubs. The winners from the southern states represented an army of 200,000 young people. The champion corn grower produced 232 bushels of corn per acre at a cost of less than 20 cents per bushel. In presenting the coveted diplomas the Secretary of Agriculture said: "The system that you have followed is one which, if pursued by all the farmers in this nation, might revolutionize agriculture and make it impossible for this country for many generations to come to think of dependence on foreign nations for its food supplies."

DOMESTIC SCIENCE IN RURAL SCHOOLS.

The attempt to introduce into the schools a new line of any kind is always attended by two problems; first, the creation of a sentiment in favor of the work; second, the preparation of teachers to teach it. This statement holds good with reference to the attempt to introduce domestic science into the rural schools.

What is this domestic science and art which have been added to the subjects taught in so many schools throughout the land and at which many people look with suspicion and displeasure, declaring it to be entirely out of place in the public schools?

Under these terms are included the various household arts, such as the preparation of food, the making of garments and household articles, the building, furnishing, and sanitation of the home. In other words, it includes all those subjects which have to do with the maintenance of the home and the care of its inmates. The principles of chemistry, physics, and biology are unconsciously used to carry on the process of cooking and cleaning; while the principles of the fine art must be used for the other processes such as the furnishing and decorating of the home. So we may really call this subject one form of applied science.

The term "domestic" carries with it the thought of things connected with the home. In the maintenance of the home, energy, time, and money must be expended and the children should be taught to estimate correctly the value of these three things. How to conduct the home on this principle is one branch of the subject.

As we look about us and study the homes and children in the homes, we soon realize that there is a vast waste

of this time, money, and energy. The home is the unit of society and the management of the home is a business in which the wife is a partner. The success of the enterprise depends on her ability to direct and spend wisely. Then if so much depends on the wife, surely our girls should be as well trained for the business of directing and spending as our boys are for earning. If a young man chooses to be a farmer, he can not afford to miss an education. If a young woman chooses to be a housewife, can she afford to miss an education? In these days it is generally admitted that girls have as much right to the possession and enjoyment of an education as have boys; but as their duties are not the same, their training should differ in some particulars.

There are many people who think the proper place for a girl to learn these things is in her own home with her mother as instructor. This is all well enough providing the mother is capable. How many mothers are well versed in household management, home hygiene, food values, etc.? The usual result of such training is: if the mother is a good housekeeper the daughter will be a good housekeeper, if the mother is a slovenly housekeeper the daughter's home will not bear very close inspection.

Until teachers in the rural districts are better prepared it is best to undertake only a few things but those few things should be practical and should be studied in such a way as to awaken an interest for further investigation. The teacher should be given a definite idea of how to proceed with the work which may make possible the teaching of a complete course later. Many schools teach cooking and sewing, two accomplishments of which any woman might be proud, as they are not only

useful but add to the happiness of herself and others.

A course in plain housekeeping might be suggested, girls could be taught how to buy and cook the simplest and cheapest food, how to decorate their homes in a plain and tasteful way, and how to choose the clothes best suited to their own purposes. They could hold cloth, vegetable and fruit judging contests while the boys were judging stock and grain.

A complete outfit for a rural school can be bought for eight or ten dollars and with this equipment domestic sci-

they will understand why there is this difference. When they know that the starch is the nutritive part of the potato and that it is most abundant in the outer layers, they will remove a thin paring or will cook it in the skin.

The serving of noon-day lunches has been successfully tried in a number of schools and from this practice the fundamental principles of cooking, the elements of nutrition, and also proper rules for serving, with points on table manners could be learned. The teacher could keep an account of the materials which might be furnished by the chil-



WORK DONE BY THE FIRST SEWING CLASS IN A COUNTRY SCHOOL.

ence could be thoroughly taught. With a more simple outfit many lessons can be taught and an interest awakened. For example a lesson could be given on the potato with an alcohol or coal-oil lamp, a few knives, forks, spoons, and pans. The amount of water, starch, and cellulose in a potato could be shown, also that there is a difference in the mealiness of potatoes which have been pared and soaked for a long time in cold water and those which have been cooked as soon as pared. When the children learn that the starch is held in the cellulose pockets of the potato and can be washed out by cold water

dren. A satisfactory fireless cooker could be made out of a barrel and some hay and in this cooker hams could be boiled and cereals could be well cooked with very little cost.

The School Improvement Association of Alabama has taken up the introduction of domestic science in the rural schools and is endeavoring to show that it is possible for a teacher of a one room rural school to successfully conduct a class in the subject—with a very simple outfit. The plan followed is for the teacher to organize the older pupils into a club, meet once a week at the school house after the regular

school hours and carry on the work.

A great step toward the betterment of farm life is the consolidation of rural schools. The neighborhood district schools are adapted to a people in a pioneer condition of society. When present conditions demand the teaching of many new branches of study, the district school is not suited to meet these demands of the modern community. In these days of good roads it would be better for parents to send their children a greater distance and have one good centralized school with proper grading and equipment. In such a school domestic science would be an important department with modern equipment and a special teacher and would be taught with the greatest efficiency.

Hazel B. Williams, '14.

Children's Gold and Silver Medal Contest on Repair and Maintenance of Earth Roads.

It has just been announced that the time in which children may submit essays on the repair and maintenance of earth roads in competition for the gold and two silver medals, has been extended to March 2, 1914.

The conditions for the essay contest are as follows:

1. The subject of the essay shall be the Repair and Keeping Up of Earth Roads.

2. It is open only to children from 10 to 15 years, inclusive, who are actually living on farms and who are actually attending some school.

3. The essay should not be more than 800 words in length, in the handwriting of the child, and should be written on only one side of the paper.

4. In the upper left-hand corner of the first page should appear the following statement: Essay on Earth Roads

by (name of child; actual residence of child; school attended by child).

5. Children wishing to enter this contest may ask the advice of their parents, teachers, neighbors, highway commissioners, and other people, and read books or magazines giving information about the subject. They must not give the information they gain this way in the exact words of an adult or the author of a book. They must express the ideas in their own language. They will not be expected to use technical terms, and any words that make the meaning clear will be acceptable.

6. The essays will be rated by an impartial committee according to the understanding of the subject shown by the child and according to the penmanship, English and spelling. The writer of the best essay will receive a gold medal; the writer of the next best essay, a silver medal; and the writer of the third best essay, a silver medal.

7. All essays should be plainly addressed to "Committee on Children's Road Essay Contest. Office of Public Roads, U. S. Department of Agriculture, Washington, D. C.," and should be mailed to reach that office not later than 9 A. M. on Monday, March 2, 1914.

8. Children who have already submitted essays in that contest which was originally announced to close October 15, may, if they wish submit a second essay.

In collecting facts for the composition it is suggested that a good and a bad road be examined—in dry weather. Then after a rainstorm notice both stretches of road and the effects of travel on each. The drainage and slope of the road, the construction and use of a drag, etc., are items which may be discussed.

The composition is to be written in clear simple English, not as an examin-

ation paper but as if writing to a friend telling how some particular stretch of road may be made better and kept from getting full of holes, ruts and puddles.

This is a splendid opportunity for boys and girls to show what they can do, being well worth any effort they may put forth. Why not take the matter up in school? Let the teachers interest the children in this contest; it will be directly valuable for the English classes as well as the secondary agricultural work. We should like to see all the medals come to Ohio.

Did you ever stop to consider how readily lessons in agriculture and domestic science would be adapted to the famous Montessori Method of instruction? Dr. Montessori who is now in the United States insists that the mental

and spiritual growth of the child, like the physical growth of a young plant or animal, comes through nourishment and not repression; that the duty of the teacher is to guide far more than to check. There is a vast amount of truth in her doctrine and undoubtedly room for improvement in our own schools along these lines. The child is the natural imitator of the parent. Therefore the girls make mud pies and play at keeping house, while the boys play team or fight battles. The girls are naturally interested in domestic science and it would be a delight to guide them along the lines of scientific house-keeping. The boys are always interested in all phases of animal husbandry or agronomy and no checking is needed but simply a guiding hand on the part of the teacher.

WILLIAM DEERING.

Wm. Deering was born in Maine, April, 1826. He received a common school education and later was a student of Wesleyan Seminary, Beadfield, Maine. He soon engaged in the woolen and dry goods business. Later he was in a firm known as the Deering, Milliken & Co. The firm furnished supplies for the federal army during the war. About the year of 1870 he sold his interest and went to Illinois. A little later he and a certain Mr. Gammon founded a combine. They manufactured the old style reapers. Later when he was left alone Mr. Deering placed on the market the Marsh Harvester. He persuaded the inventor of the Appleby twine binder to perfect the machine and adapt it to the Marsh Har-

vester. This was accomplished with considerable success in 1880. From the year of 1880 and onward Mr. Deering's progress was steadily and sweeping upward. In 1883 the company was incorporated under the name of Wm. Deering & Co. Both his sons were in the company with him. When Mr. Deering retired there were 9000 employed in the Chicago plant alone.

While Mr. Deering amassed an immense fortune from the manufacture of farm machinery he also rendered a valuable service to the farmer and to all humanity. By producing an efficient and servicable binder the great grain fields of the west were made possible. The hungry hoards of mankind owe to this venerable man an undying debt of gratitude.



January News Notes

During the short course beginning January 5, and ending February 27, a number of excellent authorities will be present to speak on various educational subjects. Among those scheduled are: Dean H. C. Price, Pres. W. O. Thompson, Hon. A. P. Sandles, Horace L. Brittain, director of school survey; S. E. Strode, Agricultural Commission; C. G. Williams, Ohio Experiment Station; Paul Fisher, State Veterinarian; John L. Shawver, Paul L. Vote, Prof. of Sociology at Miami University; Hon. C. T. Swain, Speaker House of Representatives; Joseph E. Wing, N. E. Shaw, State Orchard Inspector; S. A. Horbourn, J. Warren Smith, A. B. Graham, E. J. Riggs, State Horticultural Department; J. R. Clark, Walter G. Fiske, and Director C. E. Thorne of the Ohio Experiment Station.

The Secretary of Agriculture published his annual report for the year 1913 on December 8. The report differs in many respects from those previously issued. A great deal of attention is given to tenancy, absentee ownership, depleted soils, failure of farmers to apply existing knowledge, and similar subjects.

The Ohio rural credit commission, composed of Senator John Cunningham, of Knox County, and Representative W. M. Brown, of Ashland County,

has submitted its report containing the results of a tour of investigation through twelve countries of Europe.

A few of the suggestions made by the commission are:

The establishment by the Agricultural Commission of a bureau of marketing for the purpose of helping the producer to find the best market for his product.

A county demonstration farm and county agent of the agricultural commission.

The holding of a short course in scientific agriculture, once a year, in every county of Ohio.

Co-operation between the Agricultural Commission and the Agricultural College of the State University.

A provision whereby farmers may secure farm raised products not produced in Ohio from farmers' organizations in other states.

An investigation of the business practices and customs of commission merchants.

Funds for carrying out these plans are secured by mutual pledges of property or credit, all parties joining in a collective guarantee of the securities issued.

B. S. Bartlouw, chief of the dairy and food division of the Ohio Agricultural Commission, addressed the Agricultural Society at their December meeting. His

topic was "Some Points of the Work of the Agricultural Commission." Mr. Bartlou related the history of the dairy and food department, and the changes it has undergone. Great praise was given S. E. Strode for his work in the establishment of a uniform system of dairy inspection.

The first annual meeting of the Ohio Agricultural Commission was held in Columbus during the week of January 12th. Senators Pomerene, of Ohio, and Kenyon, of Iowa, spoke. These two men have been fighting for an appropriation from the national government to combat hog cholera. Different societies and organizations over the state sent delegates.

Any person or organization desiring the reading course which is being given by the college of agriculture should write to Prof. A. B. Graham. Several books have been chosen which will constitute the course and the names of these can be obtained on application.

V. C. Smith, secretary of Dean H. C. Price, has completed a census of the freshman class in the college of agriculture in reference to the occupations which they represent. It was found that 56% of the class come from the farm and that the remainder of the class hails from the city, representing 40 different occupations.

Townshend Literary Society still hold its meetings every Monday evening in Townshend Hall. It is still attempting to enable its members to become more fluent speakers. The annual Townshend-Athenean inter-society debate will probably be held late in February. The question is; Resolved, that all American coast-wise vessels

should be permitted to pass through the Panama Canal exempt from toll. Townshend will debate the negative side of the question.

Student pastor, Rev. I. G. McCormack, has a class of agriculture students who meet every Sunday afternoon in the Ohio Union to study rural conditions, especially the rural church. A text book, Fiske's "Challenge of the Country" is used. The class is composed of boys from nearly all parts and sections of the state—hence actual conditions as they exist are brought forth by these members in such a manner as to be quite instructive.

At the last meeting of the University Grange the initiation ceremonies were given and a number of new members were taken in.

ANIMAL HUSBANDRY NEWS.

In a conference with the state agricultural commission held December 17, Governor Cox came out in favor of the plan to erect a coliseum for livestock shows on the Ohio State Fair grounds. The project is assured, for money saved by pruning the 1914 appropriations will be more than enough for the purpose. The proposed building will be 400 by 200 feet, and will have an arena 300 by 160 feet. In addition to being a place where the awards will be made the coliseum will be used for night shows similar to those of the International. It may also be used by classes from the agricultural college of Ohio State. If the contract is let by March the building will probably be ready for the 1914 Fair. Gov. Cox also suggested that the racing be toned up. There will probably be a Governor's Cup contest as one of the chief features.

Professor D. J. Kays addressed the Saddle and Sirloin Club, December 17th, regarding the American Trotter and Pacer. He explained why race horse enthusiasts come from every walk in life, and retraced the steps of some master breeders. The personal factor has had a great influence for improvement in those racers who have repeatedly been lowering the records on the turf. Sentiment plays a very important role in keeping up the spirit. In the business session a fob was adopted which will in the future be presented to the members of each stock judging team.

The Animal Husbandary Department sold its entire exhibit, on the Chicago market, with the exception of the Shorthorn steer which took third place in his class. Purchases of sheep and swine were made for use in the classroom, and as a foundation for next year's exhibit. They secured six specimens of the Southdown breed, one lamb from R. J. Stone, and five lambs from Robert McEwen of Canada. Two Cheviot lambs were purchased from R. and W. Postle of Camp Chase, Ohio; and three from G. W. Parnell, Wingate, Indiana. Other purchases were two Hampshires, of Walnut Hall Farm, Donerail, Ky.; one pure-bred Shropshire from Iroquois Farm, Cooperstown, N. Y.; two cross-bred lambs from R. and W. Postle; and four grade lambs from Heart's Delight Farm, Chazy, N. Y.

Otho H. Pollock, '12, of Delaware, O., again has charge of the laboratory part of the Animal Husbandry work in the Short Course in Agriculture.

The Ohio State Poultry Association will hold their annual show the week of

January 28th. It will be held in a building opposite the Ohio Electric station on Rich Street. The students who are in the poultry classes will set up the entire show. Hon. A. P. Sandles has consented to loan the association the coops belonging to the state fair association. A separate room will be given over to the students where birds and poultry appliances will be shown. The show will be educational in its nature and it is desired that a large number of farmers and others attend. A premium list may be obtained by addressing Prof. F. S. Jacoby, president of the association.

The Ohio State Beekeepers' Association will hold its winter meeting at Athens, January 14 and 15.

DAIRY NEWS.

Prof. Oscar Erf was in Washington on December 17 and 18 where he appeared before the National Dairyman's Congress relative to the oleomargarine situation.

Ohio has three cows which will finish exceptional records in a short time. They will all run better than 950 lbs. of butter fat.

There is some consideration at present whether the dairy department of the Ohio Experiment Station shall be moved to the Ohio State University grounds or remain where it is. It will soon be decided by the General Assembly.

The Ohio Dairy Show will be held in conjunction with the Dairyman's annual meeting next month. Premiums will be given for milk, butter and other products of the dairy world. Dairy machinery and implements will also be represented by the various manufacturers.



HORTICULTURE AND FORESTRY.

The Horticulture Department has recently expended \$350.00 for additional skinner system irrigation equipment. This system will be erected on part of the two acre garden tract, situated on the west side of the river.

Active work on the new greenhouses will begin this spring. The working plans of the glass houses have been drawn up. Fifteen thousand dollars has been appropriated for this work. The Department will give more attention to Floriculture in the future, and the houses as designed give adequate means for instruction along this line. The location of the houses has not yet been decided, but they will be built either directly in the rear of the new Horticulture building or to the north of it.

The State Apple Show which will be held in Cleveland, Jan. 20th to 23rd inclusive, bears evidence of being the best yet held. It is gratifying to note the interest which is being manifested by the Ohio orchardmen in this direction. The apple show is an institution that is here to stay.

Mr. Ralph Jeffries, who was an instructor in the Department last year, was married on December 3rd, to

Idalie Peter of Riverside, Cal. Mr. Jeffries spent several days in Columbus during the apple show. He is at present engaged in experiment station and extension work with the West Virginia Experiment Station, at Morgantown, W. Va.

That Horticulture is awakening wide spread interest is shown by the fact that this year there are seven girls enrolled in the course at Ohio State.

Prof. W. W. Paddock, head of the Department, was confined to his home in Arlington for two weeks during December, due to a severe attack of la grippe. In his absence C. L. Long, assistant to Prof. Paddock, met the classes in Pomology.

Three new courses will be given in the Forestry Department beginning the second semester. The first of these takes up the study of western conifers. The second deals with the physical properties of wood and its preservation. The third course deals with practical forest craft; i. e., erecting camps, cabins, bridges, etc. The class will take camping expeditions throughout the semester.

The senior class in forest management is at present making the working plans for a sixty acre forest tract near Westerville, under the direction of Prof. W. O. Pflueger. The Clay Hart farm which consists of 160 acres of standing timber is being used for this work.

Twelve men are applicants for degrees this year in forestry. Three of these will take the Civil Service examinations during the spring. C. B. Henry and H. D. Sheets, who passed

the Philippine Civil Service examination, will sail for the Philippines immediately after graduation.

AN OHIO FRUIT STORE.

The Fruit Growers' Market Co. is the name of the new store recently opened up at 110 South Fourth Street, under the management of Prof. Davis and Messrs. Riggs, Shaw, and Cleland. Much favorable comment has already resulted in several farm papers. The firm is making a specialty of extra fancy, fancy and cooking apples which are Ohio grown. The use of old fashioned market baskets, the boxes used for parcel post delivery, the labeling of all varieties of apples sold, the delivery system and many other special marketing features are worthy of mention. Besides the apples the firm handles potatoes, poultry, canned goods, honey, cider, jellies and jams; all being of Ohio production. The store offered special features which attracted many people during Christmas. Without a doubt the store is filling a long felt need in the city of Columbus.

AGRONOMY NOTES.

The next Ohio Corn Show will be held under the auspices of the Ohio Corn Improvement Association at Mansfield, January 27-30, 1914. The show promises to be a very good one. The slogan is "Better Corn and More of It." The entries close on Wednesday, January 21st.

The record yield in the corn boys' contest this year was produced by Arnett Rose of Alger. His crop yielded 131.7 bu. Four boys had over 131 bu. Twelve cash prizes were given by the Agricultural Commission in addition to the free trip.

A large wheat crop for next year now seems assured judging from the acreage and the condition of the crop. The number of acres of corn which proved a failure in some states was very great and this accounts in part for the unusual amount sown to wheat. Weather conditions since seeding have been extremely favorable in all sections. There has been plenty of rainfall and warmth with a season extending well into December to make the wheat plants vigorous. It may prove, however, that this rank growth will be a disadvantage in that freezing will occur if the winter is severe. It is reported in the western states that insect pests are in great abundance due to this growth.

Don W. Griffin has been appointed as assistant in Agronomy for next semester.

Prof. Ramsower attended a meeting of the American Society of Agricultural Engineers during the vacation.

The Ohio State University Corn and Grain Show is going to be better than ever this year. This is the third annual "Battle of the Kernels" and the fight will be a good one. It will be staged in Townshend Hall, January 28 and 29.

Prof. A. B. Graham is the author of a treatise on elementary agriculture. Farm animals and a study of the soil are the subjects which are treated. Its importance lies in the fact that it is adapted for use in rural schools and is issued in bulletin form.

Byron E. Pontius, '14, is the newly elected chairman of the Agricultural division of the committee on intramural sports at Ohio State.

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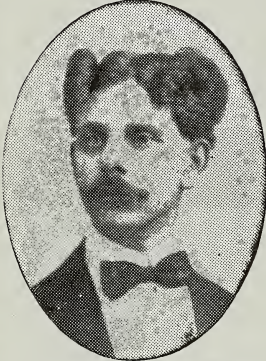
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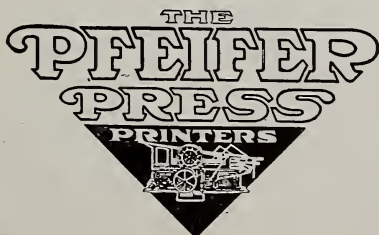
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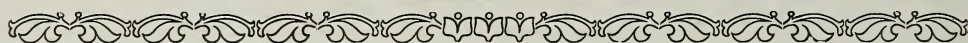
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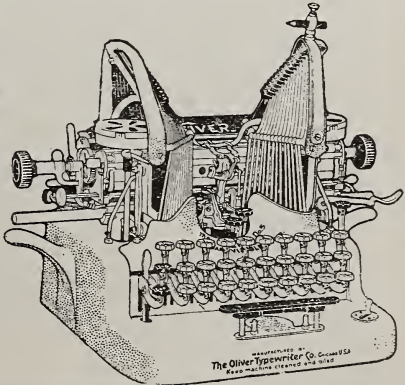
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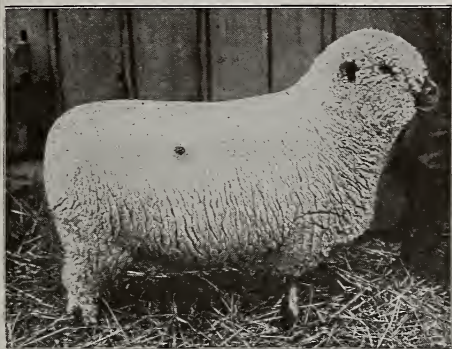
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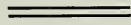
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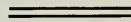
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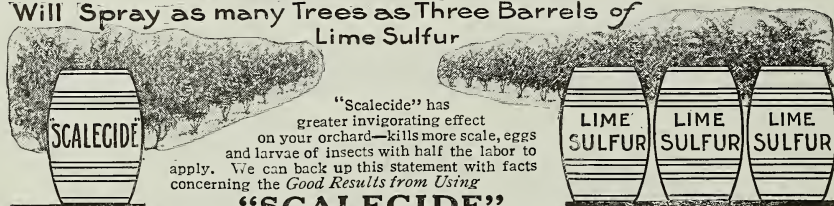


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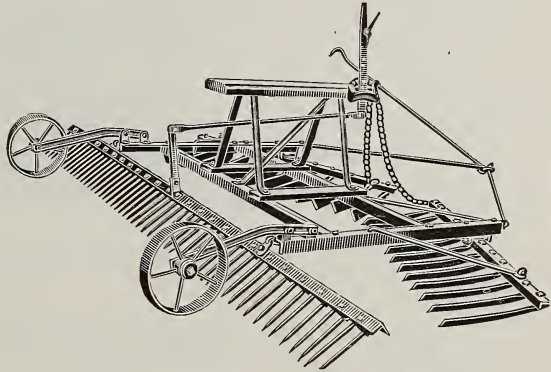
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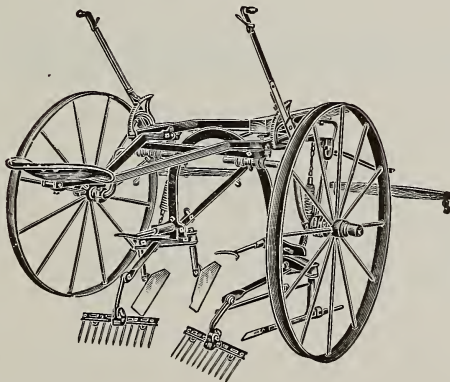
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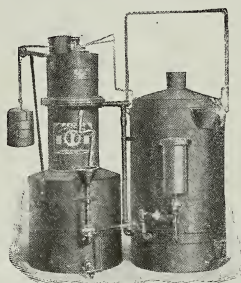
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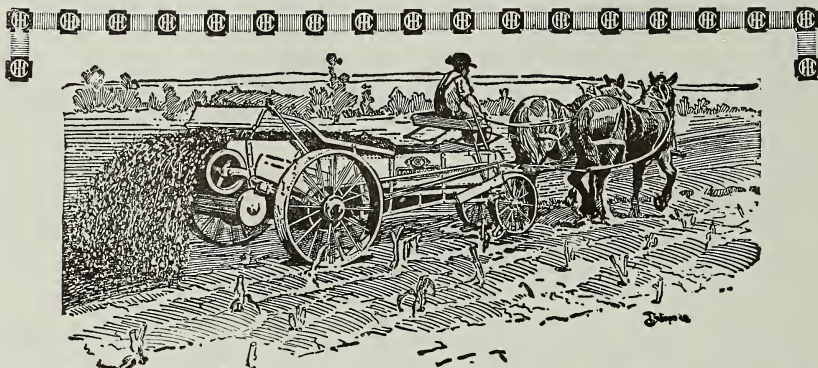
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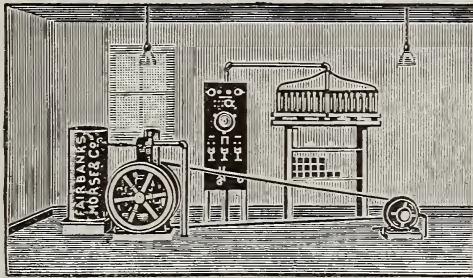
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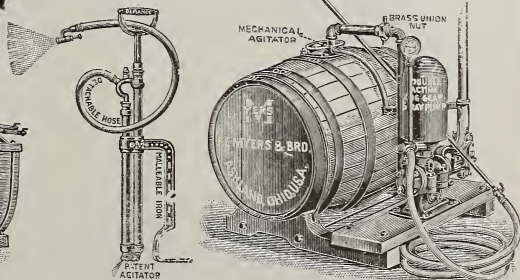
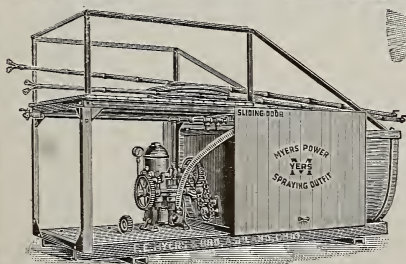
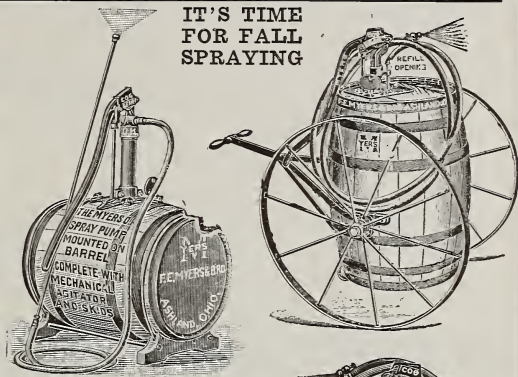
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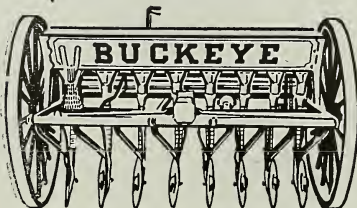
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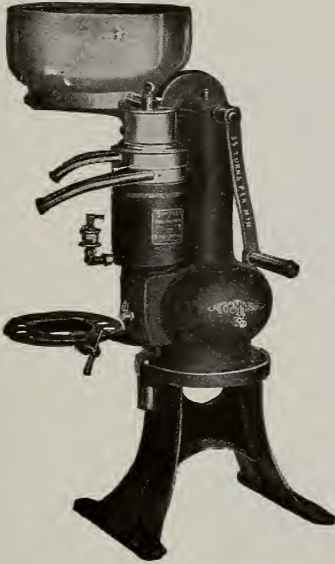
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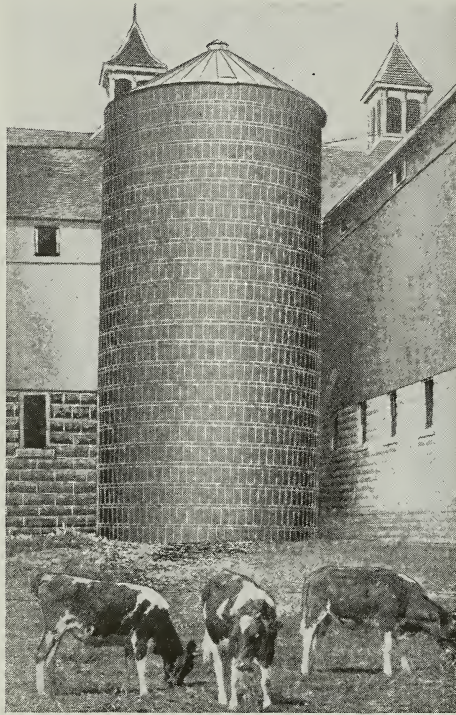
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